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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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BM 'E Series' Debuts as 4300 Line

Software Fees Zoom Up

By E. Drake Lundell Jr.
CW Staff

WHITE PLAINS, N.Y. — While IBM's 4300 announcement last week may have driven hardware prices to new lows, it had the opposite effect on software and software service prices.

The company unbundled parts of its operating systems and all software maintenance. This means all IBM users will have to pay for some software that was previously free and will have to pay to have their operating systems maintained by IBM.

In most cases, the price of software will be an important factor in the price of a total system.

At the same time, however, the updated software and increased use of microcode for parts of the operating

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Some Software No Longer Free

By E. Drake Lundell Jr.
CW Staff

WHITE PLAINS, N.Y. — With the introduction of its 4300 line here last week, IBM began pricing separately for certain operating system segments that previously were offered free.

IBM announced three releases of Systems Control Programs for operating systems: the Disk Operating System/Virtual Storage Extended (DOS/VSE), based on DOS/VS; Release 6 of the Virtual Machine Facility/370 (VM/370); and Release 7 of the Operating System/Virtual Storage 1 (OS/VS1).

While all three are based on earlier operating systems, they contain new functions. In many cases, however, functions which were previously part

(Continued on Page 8)

Iron Prices Hit New Low

By E. Drake Lundell Jr.
CW Staff

WHITE PLAINS, N.Y. — "E" stands for "Exciting."

That's what many users are going to think when they take their first look at IBM's long-awaited E series of computers, which surfaced here last week as the 4331 and 4341 processors.

The units feature all the technological gains IBM has announced in the past year, extremely low hardware prices, upgraded operating systems with completely different pricing strategies, a fascinating new disk controller and greatly increased disk recording capacities — while still maintaining compatibility with the 370 and 360 lines.

The 4331 will be shipped as early as the second quarter of this year while the 4341 will be available in the fourth quarter.

The hardware prices are clearly the most exciting thing about the units, with IBM now offering a 4:1 improvement in price/performance over previous systems when the hardware alone is considered. However, the software pricing and continued unbun-

(Continued on Page 6)

Vendors: 4300 Means User Relief

By Marcia Blumenthal
CW Staff

While IBM's competitors were gritting their teeth after IBM announced its 4300 series last week, DP managers were breathing long sighs of relief.

That was the scenario envisioned by third-party vendors interviewed less than 24 hours after word of IBM's 4300 series hit the streets. IBM claimed the processors offer significantly better price/performance than its own 370/115 through 148 models.

IBM's product offerings will have a double-barreled effect on the DP user, according to Michael Vargo, executive vice-president of CMI Corp. The prices of models 135 through 148 will cascade, bottoming out when IBM begins shipping its first 4300s.

Vargo, like other third-party vendors, said DP managers could begin to decide which products to acquire for their installations. The imminent ordering fervor will end the holding patterns DP managers have maintained for the past four or five months while waiting for IBM to launch its heralded E series.

Within the next 30 to 45 days, CMI will be able to supply new 138s, including integrated file attachments, a power supply and 1M bytes of memory for $185,000. These products were quoted at $260,000 just prior to IBM's announcement. Similarly, the vendor will offer new 148s with integrated storage control, a power supply and

(Continued on Page 4)

IBM SYSTEM / CHARACTERISTICS	370/115-0	370/125-2	4331	370/138	370/148	4341	370/158-3	3031
Relative Performance[1]	2.25	6.3	11[1*]	11.7	24	37[1*]	45	54
Memory Size in Bytes (Minimum to Maximum)	65K-384K	96K-512K	512K-1M	512K-1M	1M-2M	2M-4M	512K-6M	2M-6M
Purchase Price[2] (Memory Size)	$91,000[4] (384K)	$179,750[4] (512K)	$68,760[3] (512K)	$271,260[4] (1M)	$450,300[4] (1 M)	$248,760[3] (2M)	$1,545,365 (2M)	$1,000,000 (2M)
Monthly Lease (Lease Term)	$2,880 (4 Years)	$5,915 (4 Years)	$1,679[3] (2 Years)	$10,439 (4 Years)	$17,624 (4 Years)	$6,069[3] (2 Years)	$44,255 (4 Years)	$25,000 (4 Years)
Memory Cycle Time (Nsec)	480	320-480	1,300 (Per 4 Bytes)	715-935	405-540	Not Available	690-1,035	345
Machine Cycle Time (Nsec)	480	480	900 (Per 4 Bytes)	275-1,430	180-225	150-300	115	115
Channels (Minimum to Maximum)	1	1	0-2	3	5	3-6	0-6	6
Price per 1M Byte Of Main Memory	$75,000[5]	$75,000[5]	$15,000	$75,000[5]	$75,000[5]	$15,000	$75,000	$75,000

CW Chart by M. Rosenberg

1. Relative throughput based on the IBM 370/158-3 equalling 45. Performance is based on IBM's claims at time of product announcement, later adjusted as user benchmarks and experience were reported. Compiled by International Data Corp.'s Information Systems Planning Service in cooperation with Computerworld. Performance figures for systems with an asterisk (*) are based solely on the manufacturer's claims.
2. For a configuration including CPU, stated main memory, power supply, console and minimum channels.
3. Purchase and lease prices for the 4331 and 4341 include price of the 3278 Model 2A display console (purchase, $3,760; lease, $94) to conform to above configuration.
4. Purchase prices for 370/115, 125, 138 and 148 reflect newly reduced prices as of last week.
5. Price reductions on the above 370 systems affect processor and associated minimum memory. Price per 1M byte of memory increment is unchanged.

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More IBM 4300 Models Expected

NEW YORK — IBM's first two models of the E series represent "revolutionary capability" with evolutionary growth, according to Advanced Computer Techniques Corp.'s Technology Analysis Group (ACT/TAG) here, which prepared the accompanying chart.

The 4331 and 4341, however, mark only the beginning of products in the E series, the group said, adding that additional units may be announced as early as this summer.

Inca-3 (IBM's internal code name) will probably be the next unit in the series, ACT/TAG said, and should bridge the performance gap between the 4331 and 4341. Maya-4, or the E4, should offer greater performance per dollar than the IBM 3031, according to the projections for the expected processors.

Previous predictions of E series performance [CW, Jan. 15] appear to be on target when the cost of the required System Control Programs are factored into the purchase prices of the systems, ACT/TAG said. A rough idea of the System Control Program cost over a five-year period is factored into the equation and presented on the accompanying chart.

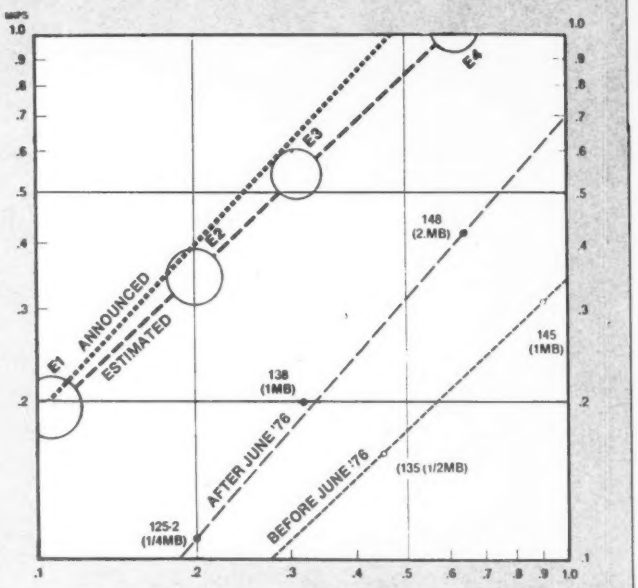
Apparently the 4341, previously known as the E3, was priced in order not to impact booked revenue for the 370/148 and 3031 at this time. Moreover, the purchase discounts on most systems should encourage users to convert to purchase prior to the availability of the E4 in 1980, the group said.

In addition, the prices of the E1, or 4331, should be aggressively competitive with the prices of the System/38 from IBM's General Systems Division — particularly for customers migrating from the System/3, ACT said.

The unit will provide stronger than expected competition for minicomputer products from such firms as Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co., the group also predicted.

As a warning to users, the group "strongly recommended" that 370/148 and 3031 users not purchase their mainframes until they evaluate the expected Maya-2 system. That unit will offer users 1.2 times the performance of a 3031 at half the price for the basic system, ACT forecast.

**IBM "E Series"
Small-to-Medium Scale (0.1-1.0 MIPS)
Mainframe Processor
Performance/Price Comparison**



**MAINFRAME PURCHASE PRICE ($ MILLIONS)
(Includes Basic System Software Price)**

SOURCE: ACT-TECHNOLOGY ANALYSIS GROUP
SPECIAL MULTICLIENT REPORT
"IBM SYSTEMS IN THE '80S"
UPDATED JANUARY 1979

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Is it a bird? Is it a plane? No, it's just SyncSort DOS!

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Then — shazzam — everything changed. A couple of leading-edge DOS/VS users left their windows open one day. The next thing you know in flew this big new sort. It announced that it was SyncSort DOS and that it "aimed to clean up DOS sorting" the way it had OS.

Sure, there were chuckles at first. But when the big fellow in the red suit sat down to the computer to sort the laughter stopped. Because it soon became apparent that DOS/VS really did have a "Supersort" for the first time.

Since then SyncSort DOS has flown into the windows of about 400 DOS centers. The reason is simply *superperformance*. In comparison with any one of the IBM DOS mob, SyncSort DOS will yield resource savings of:

- **30-40% reduction in Elapsed Time;**
- **30% reduction in CPU Time;**
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- **30% reduction in I/O Time.**

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The next time a suspicious sort wearing baggy long johns and a counterfeit S pinned to its chest shows up, call us. We'll send over a SyncSort DOS faster than a speeding bullet — provided traffic isn't too bad.

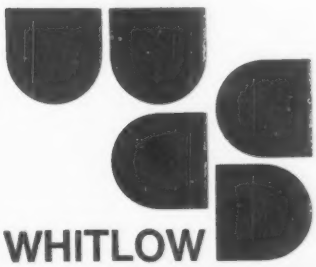
As soon as it arrives, say something like: "Okay, boys, you both claim to be supersorts. Let's see which one of you can leap over this towering load in a single bound."

Only please leave the window open. Because when that other sort gets a look at the benchmark results, it's liable to take a flying leap into outer space.

And we sure get tired of cleaning up that broken glass!

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Up to 80% More Powerful

IBM Unveils 3033 Attached Processor Version

By A CW Staff Writer

WHITE PLAINS, N.Y. — While IBM was creating most of its excitement last week in the small to medium-size processor arena, it also announced what may well be the most powerful commercial processor available.

The IBM 3033 Attached Processor (AP) complex, which combines an auxiliary processor with a host 3033 CPU, is 60% to 80% more powerful than a uniprocessor 3033, IBM said. The system may be more powerful than the IBM 3033 multiprocessor (MP) configuration in raw computing ability, the company added.

According to performance figures developed by *Computerworld* in cooperation with International Data Corp (see chart on Page 1), the AP system would rate 379, the 3033 would rate 223 and the 3033-MP would rate 374, based on IBM performance claims. The scale is based on a 158-3, which is rated at 45 (see chart on Page 1).

The top independent IBM software-compatible processor is the Amdahl Corp. 470V/8, with a rating of 360.

Separate Power

With the AP system, the two processors operate as a single entity, IBM said. Up to 16M bytes of main memory work under a single systems control program.

The two processors are powered separately, which permits the 3033 to remain in operation when the AP is out of service.

The AP complex consists of a 3033 Model A processor and a 3042 AP with two 3036 consoles and one 3038 communications unit, in addition to the two 3037 power-cooling units.

Both processors have a 57 nsec cycle time and 64K bytes of high-speed buffer storage, IBM said.

The host 3033 processor has up to 16 channels, which are used by both processors to reach the systems' peripherals. Control of the channels can be switched between the 3033 and the AP.

Communications between the processors is handled by the 3038 communications unit, IBM added.

The internal performance figures for the 3033 uniprocessor and the AP unit were made for similar configurations running identical programs under Operating System/Virtual Storage 2 Multiple Virtual Storage (OS/VS2 MVS), the firm said.

In addition to OS/VS2 MVS, the system runs under Virtual Machine Facility/370 (VM/370).

The AP complex is also supported by the MVS/Systems Extension (SE) program product and the VM/SE program product, with MVS/SE using the 370 extended facility in the processors.

3033s Field Upgradable

Already installed 3033s can be field-upgraded to the AP configuration. Field upgrades and shipments of complete AP complexes are scheduled to begin in the first quarter of 1980.

Monthly rental for a 3033-AP system with 12M bytes of storage will be $164,330, while the four-year lease rate will be $149,460/mo. The unit will sell for $5.6 million.

Upgrades to current 3033s will cost $61,270/mo on rent, $55,710/mo on a four-year lease or $1.6 million on straight purchase.

IBM 4300 Seen Signaling User Relief

(Continued from Page 1)

1M bytes of memory for $325,000, Vargo said.

Reduced Prices

In anticipation of the 4300 series, CMI had already dropped its prices for 370/135 and 370/145 models, so further price reductions for these products will be minimal. A used 135 is expected to sell for $130,000 and the 145 for $200,000. All prices include the file attachment or storage control features, a power supply and 1M bytes of memory.

Prices for all these models will erode further once IBM begins to ship its 4300s, Vargo noted.

Like CMI, the American Computer Group, Inc., formerly American Used Computer Corp., will lower its prices for the 138s and 148s in the immediate future. "At the very least, the market will cause the price of 138s to drop $60,000 and the 148s to plummet between $120,000 and $140,000 from previously quoted levels," according to William Grinker, president of American.

Prior to IBM's 4300 announcement, American was selling used 138s and 148s at 70% to 80% of IBM's list price for new equipment, Grinker reported. He expects these models to sell eventually for 50% to 60% of the price for comparable models of the 4300 series "in order to trade at all."

Comdisco, Inc. has not yet determined to what levels the prices for the 135s through 148s will drop in the near term, Kenneth Pontikes, the firm's president, said. But his company has already reduced its prices to customers seeking to sell those models, he added.

"Activity levels for those models have been low for the past few months and will continue in a holding pattern until users know when they can get 4300s delivered. Although there is now a better mousetrap, you can't get it," Pontikes remarked.

Aside from price drops, the vendors agreed that IBM's latest move will create a brisk demand for short-term leases for 138s and 148s.

Impact on Users

While the vendors agreed on price drops and demand for short-term leases for 138s and 148s, they had varied views on the ways the 4300 series will impact users.

CMI's Vargo predicted sophisticated users will create a demand for used 138s and 148s. "For certain stable applications, which can use a dedicated processor for a long period of time, the sophisticated user will think it wiser to buy a 138 or 148 and stop thinking about changing and updating software," Vargo forecast.

On the other hand, the very unsophisticated user with rapidly changing application needs will take a short-term lease because of the uncertainty of the market, Vargo continued. In the long term, the 4300 will certainly impact the 138 and 148. In cases in which the applications planned for the equipment can wait, users will opt for the 4300, he forecast.

While Vargo noted the 4300 appears to be aggressively priced, he had caveats. "When IBM told me there were about 60 blue letters coming out with these machines, I was shocked."

The blue letters are descriptions of and prices for individual IBM program products available for use with the hardware.

"The base price for the 4331 at $65,000 is startlingly low, but by the time you add all the needed features, the 138s and 148s begin to look attractive again," Vargo stressed.

Purchase Emphasis

At American, Adolf (Sonny) Monosson, chairman and chief executive officer, reacted strongly to IBM's latest market foray categorizing the offering as "not just a new price or a new machine, but the reemergence of a very aggressive IBM that has no concern about its own lease base."

"IBM is obsoleting the lease base and going into the purchase business. It is putting out new technology on a leading edge for users to employ and leaving competitors with their mouths hanging open," American's Grinker declared.

Because users will not cut their DP budgets, Grinker predicted they would favor the 4341, opting for more power. This would definitely put a cramp on the demand for used 138s, he concluded.

Grinker, unlike CMI's Vargo, did not suspect IBM was using its memory price as a loss leader. However, he did agree with Vargo that IBM was setting up a smokescreen around its software.

Corrections

In "FTC Tightening Screws on DP Vocational Schools" [CW, Jan. 8], it should have been noted that the proposed regulations voted on by the Federal Trade Commission would affect the 10,000 private vocational institutions across the U.S., not the public or not-for-profit schools.

In Part 1 of "The New Software Economics" [CW, Jan. 8], the figures in Column B — not Column A — of Figure 4 should have had three more zeros, as last week's correction stated.

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IBM Moves In Disks, Too

By E. Drake Lundell Jr.
CW Staff

WHITE PLAINS, N.Y. — In addition to announcing processors and software last week, IBM also drastically reduced the price of disk storage and introduced an intelligent controller that may lead to a back-end data base processor in the future.

The action in the disk area is almost as dramatic as any of the other actions taken last week and is certain to have long-term implications, all of which cannot be discerned at this point, industry sources indicated.

The new disk system — the 3370 — for both the 4331 and 4341 features twice the recording density of the previous 3350 disk drive.

Each drive can store up to 571M bytes. The data transfer rates have been boosted to 1.859M byte/sec through the use of a new head. The head will be manufactured using a semiconductor process, IBM said.

Up to 16 Model 3370s can be attached to a 4331 through an integrated adapter on that unit for a total disk storage capacity of 9,136M bytes.

Using the newly introduced 3880 microprocessor-based controller, up to 32 of the units can be attached to the 4341 processor through a channel on that system for a maximum storage capacity of 18,272M bytes.

Byte Price Tumbles

The price per byte of storage has tumbled even while maximum storage capacities have dramatically risen.

With the 3350, users could get 12,825 bytes of disk storage for each dollar spent, but with the 3370 they can now have 21,690 bytes for each dollar — almost double the previous cost (see accompanying chart).

Another way to view the price is on a megabyte basis, with the new units offering users 1M byte of disk storage for just $46.

As with previous IBM disks, the 3370 comes in two models, the A1 and the B1. The A1 is the first spindle in a configuration and sells for $35,100, rents for $1,058/mo and leases for $900/mo on a two-year basis. The B1 units attach to the processor through the Model A1, and each sells for $23,400, rents for $705/mo and leases for $600/mo on a similar deal.

Therefore, a typical string of four drives with a total capacity of 2,284M bytes will sell for $105,300.

Future Potential

The new controller — the 3880 — has been announced only for the 4341 at present, but industry sources last week indicated the unit may have the potential of becoming a back-end processor to handle data base functions for all future IBM disk products.

"Central to the operation of the 3880 is a new LSI bipolar microcontroller chip which has been personalized and programmed to assist in directing the flow of data and handling communications with the channel," IBM said.

The chip is basically fabricated from a master slice of more than 1,400 gates and includes more than 14,000 components, the firm added.

Basically the unit is an extremely fast

(Continued on Page 7)

IBM TECHNOLOGY INSERTION STRATEGY

DISK			MEMORY		
Model	Year Announced	Bytes/$1	Model	Year Announced	Price per 1M Byte
2311	1964	300	360/30	1964	$2,000,000
2314	1965	1,300	370/155	1970	600,000
3330-SD	1970	3,800	370/135	1971	640,000
3340	1973	3,500	370/115	1973	300,000
3330-DD	1973	5,300	5100	1975	180,000
3344	1975	11,300	158/168	5/76	170,000
3350	1975	12,825	Series/1	11/76	120,000
3370	1979	16,268	3033	4/77	110,000
			8100	10/78	18,000
			30 Series	12/78	75,000
			4300	1/79	15,000

Chart courtesy of International Data Corp. Updated by CW for the 3370 and 4300.

The Declining Prices of Disk Storage and Main Memory From 1964 to the Present

If Beethoven Had Selected a Piano the Way Some Do TP Monitors ...



He'd Still Be Playing "Mary Had a Little Lamb"

Whether your company presently deals in five-finger exercises or symphonies, it's hard to predict exactly what will be happening five years from now, no matter how well-laid-out your growth plans. So it's vital to select a TP monitor with the flexibility to expand with you and meet those currently unknown needs.

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IBM 4300 Notable for Price/Performance Ratio

(Continued from Page 1)

dling of operating system segments as well as operating systems maintenance may take the glow off those hardware prices as the 4300 family matures.

IBM is offering the 4341, which has 50% more processing power than the 370/148, for half the price of that earlier machine. The 4331, with almost twice the power of the 370/125, costs less than half the price of the 125.

And those comparisons take into consideration the major reductions IBM made in the purchase prices of its 370/115, 125, 138 and 148 last week.

At the same time, IBM dramatically lowered the price of main memory, reducing the price 1M byte of large processor storage from $75,000 to $15,000 in one fell swoop.

The great price reductions offered by the 4300 hardware can be seen with some comparisons.

A basic 4331 with 1M byte of main memory and a relative power rating of about 11 (see chart on Page 1) costs $72,500. This is almost double the power of the 370/125, which is rated at 6.3 but costs $179,750 for a similar processor with only 512K bytes of storage. And that 125 price was reduced last week from a previous price of $216,100.

In fact, the 4331 at 11 is almost as powerful as a 370/138, which is rated at 11.7. However, the 4331 with 1M byte costs considerably less than the 138's new price of $260,400. The Model 138 cost $316,100 before last week's price cuts.

Similarly, the 4341, with a rating of 37, is 50% more powerful than the 370/148, which is rated at 24. However, a 2M-byte 4341 costs only $245,000, while the new price for a 2M-byte 370/148 is $513,750, reduced from $623,450.

The 4341 is not far from the power range of the 370/158-1, which two years ago — before price reductions — cost almost $2 million, leaving users with almost a 10:1 price reduction for similar power in those two years.

Even today the 4341, at $245,000 for 2M-byte system, is considerably less expensive than the 370/158-3, which is priced at $1,493,600 and which is only marginally more powerful in internal performance than the 4341.

Total Systems Prices

Those prices are for a CPU, power supplies and consoles alone; the price for a complete system will be considerably higher.

For example, a 4331 processor with integrated disk, tape and communications adapters, a 1,200 bit/sec communications line, console and keyboard, a two-spindle Model 3310 disk with a 130M-byte capacity, a Model 8809 tape drive, user diskette and two Model 3278 CRTs will sell for $141,378, lease for $3,572/mo or rent for $4,198/mo.

IBM is now quoting two-year lease prices; it previously encouraged four-year leases.

A 2M-byte 4341 with the Model 3278 console, Model 3880 storage control, 280M bytes of Model 3340 disk storage, 1G byte of 3370 disk storage, a 3803 tape controller, four 3420 tape drives, a 3203 Model 5 printer, a 3505 card reader and a 3525 punch and a 3704 communications controller will cost $644,548, and lease for $16,707/mo.

Neither of those price estimates include any software, which could add at least $300/mo to the cost for users running the DOS/VSE operating system (see related story).

While CPU hardware prices have been tumbling dramatically, IBM has put higher price tags and separate charges on software and made smaller reductions in peripherals prices.

The combination of these two factors will make it harder for users who have traditionally priced systems based on hardware components with little consideration for the price of software.

Both of the 4300 processors use the IBM 64K-bit memory chip, but density at the module level has been doubled by stacking two 2.5-square-centimeter ceramic substrates, each of which holds four of the 64K-bit chips for a total 512K bytes in one module.

On the chip — which has 32 times the packing density of the memory chips used in the 370/138 — functions such as timing and addressing have been integrated. The chips also contain two 8-bit high-speed buffers capable of data rates of 100 nsec.

Memory cycle time is 1,300 nsec for four bytes on the 4331.

Both of the processors also use high-density logic chips, each with up to 704 circuits, which can be switched at speeds of 3 nsec. Machine cycle times are 900 nsec for four bytes on the 4331 and 150 nsec to 300 nsec on the 4341.

The dense packaging has reduced the space and power requirements for the two systems. The 4331 requires up to 70% less power than the 370/138 and the 4341 requires less than half the power required by the 138, IBM said.

The 4331 comes in two memory sizes, 512K or 1M bytes, while the 4341 offers 2M- or 4M-bytes.

The 4331 should be particularly useful in distributed data processing applications, IBM indicated, since it can be used in a stand-alone mode or linked to other 4300s or 370s.

It features an integrated communications adapter instead of requiring a front-end processor for communications. Available only on the 4331, this adapter can handle up to eight lines and run any two of three line disciplines concurrently. Those disciplines are bisynchronous, start/stop and Synchronous Data Link Control (SDLC), IBM said.

Data rates go up to 64K bit/sec, IBM said, adding that one high-speed line of up to 58K bit/sec can be operated concurrently with low-speed lines on the system.

The 4341, on the other hand, uses a more traditional front end for communications, such as the 3705 communications controller.

Disk Drive Debut

A special disk drive — the 3310 — was announced for the 4331. The sealed disk drive features a storage capacity of up to 64.5M byte/spindle. Up to 16 3310s can be attached to a 4331 through an integrated adapter.

In addition to that disk and the 3370 disk drive (see story on Page 5), IBM also announced the Model 3262 line printer for the 4331. The printer operates at speeds of 650 line/min and attaches through an integrated adapter.

The IBM 3203 Model 5 printer was announced for both systems. It operates at 1,200 line/min with a 48-character set. Along with this printer, IBM announced 20% price reductions on the four earlier 3203 models.

The 3289 printer with 400 line/min speed is also available for the 4331.

As for prices of the peripheral units, IBM said the 3278 Model 2A CRT console with keyboard can be purchased for $3,760, leased for $94/mo on a two-year plan or rented for $111/mo.

The 3310 disk unit with 64.5M bytes of storage can be purchased for $12,960, leased for $360/mo or rented for $423/mo.

The 3262 printer can be purchased for $14,000, leased for $350/mo or rented for $411/mo.

The 3203 Model 5 printer can be purchased for $38,320, leased at $1,255/mo or rented for $1,475. Corresponding prices for the 3289 Model 4 printer are $13,250, $473/mo and $556/mo.

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And Borrows 3370 Drive

GSD Makes Memory Price Cuts Up to 33%

By a CW Staff Writer

ATLANTA — Not to be completely overshadowed by "Big Brother" — IBM's Data Processing Division, which last week brought out the 4300 series — the General Systems Division (GSD) announced price cuts and new products here last week.

The purchase price cuts, which range up to 33%, cover memory increments on GSD's System/3 models 8, 12 and 15, the System/32, System/34, 5100, 5110 and the 4953 and 4955 processors in the Series/1 line.

Rental and lease prices were also cut by about 20% for the memory increments in the System/3 models 8, 12 and 15 and for the System/32.

Disk Adapted for System/38

In the new product action, GSD adapted the 3370 disk drive newly announced by the Data Processing Division and hooked it up to the System/38, giving that unit a total disk capacity of 2,672.6M bytes.

Up to four of the 3370s can be attached to the System/38, each with a capacity of 571.3M bytes for a total of 2,285.5M bytes, GSD said. This is added to the previous top capacity of the System/38's integrated disk drive of 387.1M bytes for the new system totals.

Users must have at least 64.5M bytes of this integrated storage with the System/38, the firm added.

With the 3370, the average seek time is 20 msec and the nominal data rate is 1.859M byte/sec. With the integrated disk on the System/38, the average seek time is 27 msec and the data rate is 1.031M byte/sec.

Two 3370 models are available. The model A11 attaches to the 5381 system unit Model 5; up to three model B11s can be connected to the system through the model A11 unit.

The A11 carries a purchase price of $35,100. It can be leased for $900/mo on a two-year deal or rented for $1,058/mo. Corresponding charges for each B11 unit are $23,400, $600 and $705.

A 3370 Model A11 disk storage attachment (No. 1130) and a processor expansion unit (No. 6303) are required to add the disk drives. The attachment feature can be leased for $145/mo, rented for $167/mo or purchased for $4,850.

The charges for the processor expansion feature are $15, $17 and $585, respectively.

The GSD price reductions for processors may be particularly significant in the Series/1 area, where the firm is believed to be having difficulties meeting corporate expectations. For the purchase-only systems, the price for a 16K-byte 4953 processor is now $1,170 compared with the old price of $1,510. A 32K-byte 4953 now costs $1,560 compared with $2,215 earlier.

The 16K version of the Series/1 4955 processor has been reduced from $1,750 to $1,580, the firm said, while the 32K version now costs $2,350, down from $2,600.

The price reductions for the System/32 and System/34 affect only memory increments, with an 8K-byte increment now available at a purchase price of $588, compared with $878 before.

On the System/3, GSD provided two examples of typical configurations. A System/3 Model 8 with 16K bytes of main storage, 4.9M bytes of disk, a 100 line/min printer and a 3741 data station formerly cost $53,833; it now sells for $48,942.

A larger system — a System/3 Model 15D with 512K bytes of main memory, 506M bytes of disk storage, a directly attached 3741, a 1,100 line/min printer, one 3411 tape drive, one 3410 tape drive and support for 15 CRTs — now costs $330,137, down from $358,815.

The price reductions are effective immediately. The 3370 disk units will be available with the System/38 in February 1980.

IBM Very Busy In Disks, Too

(Continued from Page 5)

microprocessor, capable of operating at up to 5 million instructions per second (Mips). It has 94 I/O signal lines, built-in error detection circuits, 16-bit microinstructions and 8-bit data words, IBM said.

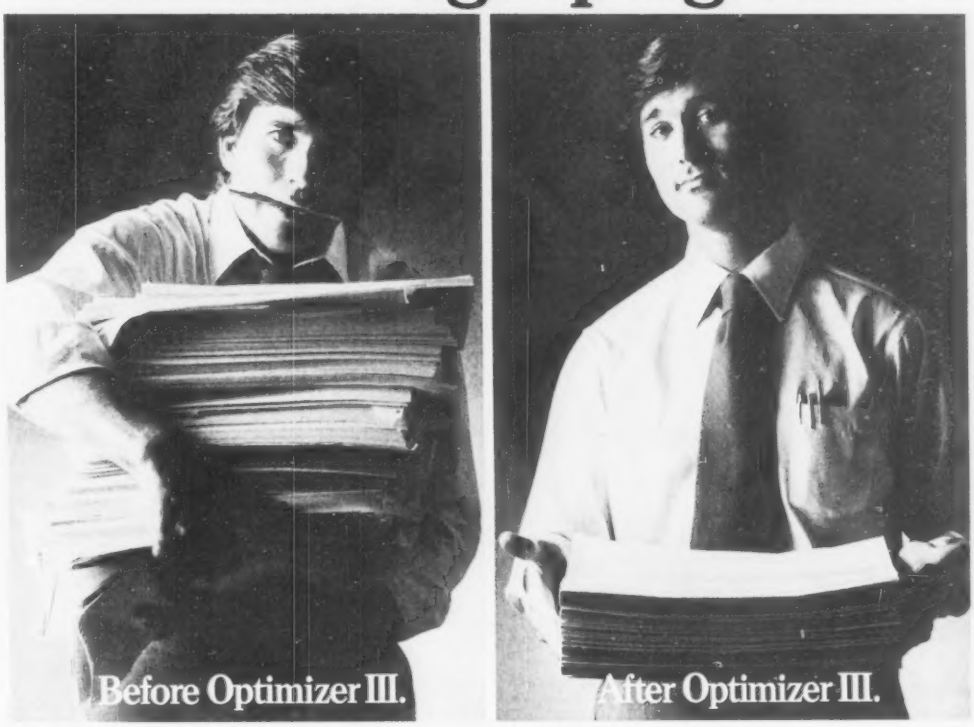
Although the controller is programmable, IBM will not allow user programming with the unit, a spokesman said. However, he indicated that IBM may upgrade the unit over time by programming it for special applications.

The unit provides two separate data paths for data from a disk unit into a processor. The two paths can be attached to the same 4341 through the use of two block multiplexer channels or can attach to the channels of two separate processors, IBM said, so that disk storage can be shared between two systems.

On the other side, 3370, 3340 and 3344 disk units can be attached to the controller or a mixture of 3370s and 3344s can be hooked up, IBM said.

The unit costs $62,350, leases for $1,450/mo and rents for $1,704/mo.

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Software Prices Zoom as IBM Announces 4300

(Continued from Page 1)
systems will offer users "significantly" increased capabilities, particularly in the area of DOS/VS, IBM said.

Support Center

IBM has established a support center and now will charge for on-site support of program products and Systems Control Programs. In the past, service for Systems Control Programs was free.

The support center will be available to users 24 hours a day, seven days a week, IBM said. With a toll-free telephone number, users can call the center with software problems and receive advice over the phone.

"Extensive tests" have shown that many software problems can be solved in this manner, IBM claimed. Previously a user with a software problem would call a local branch office, which would send a systems engineer to the installation as soon as possible.

The telephone service will be available free under the basic license fee for program products and for Systems Control Programs that are still included in the price of the IBM hardware, the firm said.

Two Options

However, IBM has set up two new classes of charges for users who need more than telephone help. Beginning next January, program products from IBM will come with an optional charge for on-site software support, in addition to their basic licensing fee.

A user can select this option and receive all of the on-site help needed without further charge; alternately, systems engineering services are available on an hourly basis.

The current rate is $70 per hour. An IBM spokeswoman did not know if there would be a minimum charge for on-site calls.

In all cases, IBM said, the planned licensing fee plus the on-site support fee should cost about the same as the current licensing fee.

For example, the Network Operating Support Program (No. 5735-XX2) today costs $125/mo on straight license. After January 1980, the basic license fee will be $95/mo and the support fee will be $30/mo.

The Cobol DOS V-3 compiler (No. 5736-CB2) now costs $63/mo, but it will carry a license charge of $58/mo and a support charge of $5/mo under the new arrangement.

Operating Systems Support

The support charges will be more serious in the area of operating systems since all such support, as well as the Systems Control Programs themselves, were previously offered at no charge.

In this category of support, all IBM users will be hit, not just the users of the 4300 systems. They will be charged for operating systems support — if they want it — according to the processor they have, not according to the operating system they are running, the spokeswoman said.

For example, users of a 370/115 will be charged $140/mo if they want to have on-call, on-site service for whatever operating system they are running.

The prices go up from there. Users of 370/125s will pay $175/mo for service; 4331 users will pay $200/mo; 370/138 users will be charged $285/mo; 370/148 users will pay $435/mo; 4341 users will face a $570/mo charge; 370/158 users will pay $540/mo; 370/168 users, $775/mo; 3031 users, $575/mo; 3032 users, $775/mo; 3033 users, $1,045/mo; and users of a 3033 multiprocessor or attached processor system will pay $1,210/mo.

All of those charges are for maintenance services that were previously offered without a charge.

Some System Software Priced Separately

(Continued from Page 1)
of operating systems that were available free of charge have now been turned into program products available for a fee.

All of the operating systems run in one of two modes on the 4300 processors, 370 mode or Extended Control Program Support (ECPS) mode. The latter takes increased advantage of microcode on the 4300 systems and promises greater performance improvements, IBM said.

The most drastic changes have occurred in DOS/VS, which has been upgraded extensively. While users could previously run up to five partitions under DOS/VS, DOS/VSE is incapable of multiprogramming without a new program product called VSE Advance Function (VSE/AF).

In fact, an IBM spokesman indicated, the system would probably not be used by anyone without this program product, which carries a license fee of $130/mo with an additional $44/mo charge for maintenance. "They go arm-in-arm," he said.

However, the user does get a lot more functions for that charge. DOS/VSE with the AF program product will handle seven partitions in Release 1, scheduled for June delivery, and will handle 12 partitions in Release 2, currently scheduled for December.

At the same time, the AF program product will allow 4300s to handle 15 internal tasks concurrently in Release 1 and up to 208 internal tasks under Release 2, the spokesman said.

End to Bottlenecks

In addition, the product should almost eliminate the transient bottlenecks which have plagued DOS/VS users in the past, through the use of shorter path lengths in the supervisor state, particularly in I/O interrupt handling.

By taking advantage of microcode by running in the DOS/VSE ECPS mode, programs will be able to relocate in the channel instead of in software, cutting much of the overhead of previous DOS/VS, which seemed to bog down in high paging environments.

With this feature, all of the channel processing and the processing of channel command words will be microcode instead of software.

DOS/VSE will also be able to run in 370 mode, however, without those improvements.

New Requirements

In addition to the requirement that users purchase VSE/AF to run DOS/VSE, users will also be required to purchase some software that was previously free in the Systems Control Program.

For example, most users of DOS/VS Release 34 today are also using, without charge, Power VS for spooling, Virtual Storage Access Method (VSAM) and Bisynchronous Telecommunications Access Method (Btam) for bisynchronous communications without charge. All of these will now be priced as program products.

VSE Power will cost $40/mo for the basic license; the support option will be $12/mo. VSE Vsam will cost $35/mo and $17/mo, respectively, and Btam ES will cost $20/mo and $5/mo for service.

The Btam ES will support the integrated communications adapter on the 4331.

The user with the required VSE/AF, VSE/Power, VSE/VSAM and Btam/ES will be paying a monthly license fee of $225 and a local support fee of $78.

Program Products

In addition, IBM expects most users to opt for the VSE Interactive Computing and Control Facility (ICCF), a new program product with DOS/VSE. This is a follow-on to the previously available Entry Time-Sharing System.

This program — with a license fee of $60/mo and a support fee of $20/mo — provides prompting facilities and aids job control troubleshooting and other troubleshooting within DOS/VSE.

Another widely used feature is expected to be the Advanced Communication Function Virtual Telecommunications Access Method Extended (ACF Vtam/E), which will have a monthly license fee of $95 and a support charge of $56.

While much of the software inprovements were in the DOS area, functions were also added to VM/370 and to OS/VS1.

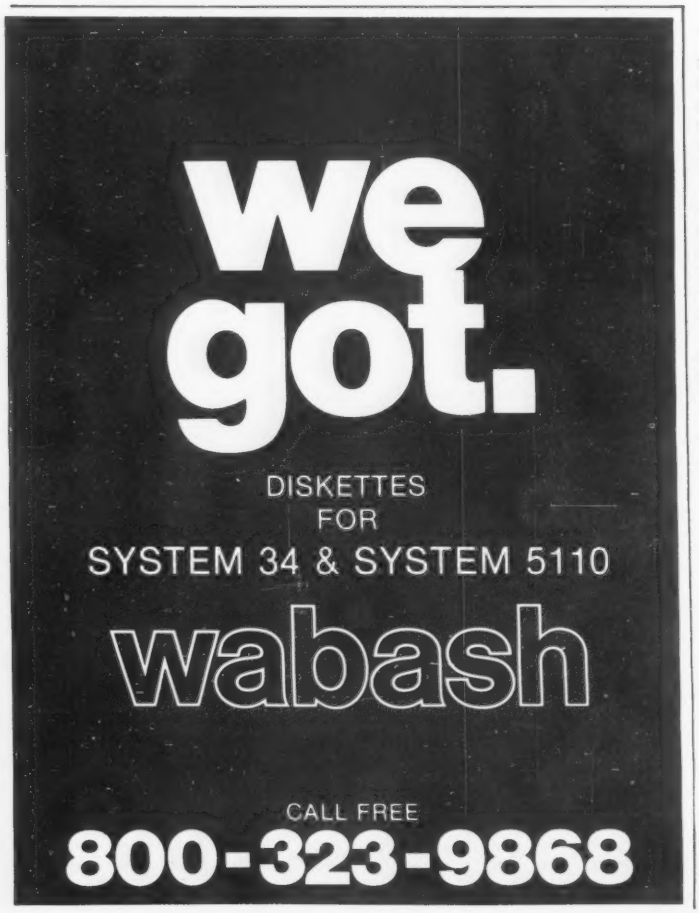
Operating in the ECPS mode for VM/370 and taking advantage of the microcode which it offers would cut VM overhead by as much as 80%, the IBM spokesman said, adding that the VM ECPS is similar to the VM Assist feature on the 370/138 and 148.

More VM Tools

Furthermore, the VM user will also get several new program products, including the VM Basic System Extension Program (often referred to as VM/Basic), which has been upgraded with this release. It now costs $125/mo for a license and $30/mo for support.

A VM Interactive File Sharing (IFS) program product is also available (license: $25/mo; support: $11/mo). This permits users running the Conversation Monitor Systems (CMS) to concurrently access the same files.

Another program product for the VM environment is the Data Management System (DMS), which allows CMS users to perform interactive screen formatting in a variety of languages including Cobol, RPG-II and PL/I. It will cost $20/mo for the basic license and support will be $7.



Mass. Loses Tie to Nlets

Power Outage 'Cooks' Law Enforcers' System

By Marguerite Zientara
CW Staff

BROOKLINE, Mass. — A severe power failure here late last month caused serious damage to the Massachusetts Department of Public Safety's DP equipment, resulting in the loss of remote communications with the statewide Law Enforcement Agency Processing System (Leaps) and the National Law Enforcement Telecommunications System (Nlets).

While the Jan. 21 outage lasted about two and a half hours, the damage to the DP center's second-generation Burroughs Corp. equipment was not discovered until power was restored, according to Emile F. Thibault, director of the DP center.

"At that time it was discovered that the system was totally inoperative because of severe power fluctuations," Thibault stated. "Basically, electrical 'spikes' got in and 'cooked' the transistors. We're talking about discrete transistors and diodes — our equipment is almost 20 years old," Thibault added.

Although the Leaps system became operational later that day, Nlets communications capability was down for three more days.

The system at the DP center consists of dual Burroughs Corp. 256K-byte B5500 units, which are designed to back each other up. The power failure precipitated a head crash on the Burroughs 100M-byte disk system, Thibault explained.

"Right now we're not sure, but there might also be damage to some of the floating I/O channels in the subsystems, and a tape drive may have marginal damage," he noted. "We can't be sure at this time exactly what the total physical damage has been."

Mini Connection Broken

Of Massachusetts' 225 law enforcement communications terminals, 10% were still inoperative three days later "because of submarginal components in the communications adapters and cabinets that were affected by the power outage," Thibault said. With the loss of the terminals, the connection with the Nlets Data General Corp. Nova 800 minicomputer located in Phoenix, Ariz., was broken.

Nlets is a message-switching communications network used by federal and state law enforcement and criminal justice agencies throughout the U.S. with the exception of Hawaii.

Massachusetts processes 60,000 to 65,000 messages per day on Nlets. "Many people depend on the terminals to get Board of Probation verification on individuals prior to their court arraignments or appearances," Thibault explained. With the system down, those people had to make verifications by telephone and then go to the Board of Probation to get the required papers.

However, the Leaps system, which handles most of the local and state police teleprocessing messages for Massachusetts, fared a bit better than Nlets. "After the power outage, we maintained important message-switching communications, but in a 'restricted service' mode for a period of time," Thibault said.

"As things began to come back up, little by little, we detected a problem in our data transmission terminal unit [DTTU], which is comprised of a number of cabinets that contain communications adapters," Thibault explained.

The DTTU routes the messages to the computer, where the information is stored on disk. "Several of these cabinets effectively got clobbered," Thibault remarked.

"The communications component has an extremely high mean-time-to-failure rate, and we've had little or no problems with that equipment, so it was never decided to back it up," he explained.

Despite the lack of communications backup equipment, the "dual and duplexed" nature of the Burroughs system renders it completely modular; some sections can be put off-line, but the system will remain fully operational, Thibault noted. "We've put the defective units into a local mode — while the repairmen work on them — and have kept the rest of the system up and running."

"Because we have dual systems, we can switch disks in and out, Thibault said, "so we were back on the air literally within hours after the major equipment was repaired on Sunday evening."

The system, which was worked on "around the clock" by a team of Burroughs engineers, became 99% operational three days after the outage and 100% operational "one or two days" after that, Thibault noted.

At last, a book for beginners that teaches structured COBOL the way professionals use it

The trouble with most books and courses is that they're unrealistic. They may teach you how to write simple card-to-printer programs, but they don't teach you what a professional programmer needs to know. They don't teach COBOL the way it's used in industry. They don't teach the most current methods of program design. And they don't teach the operating system concepts and JCL that are critical to the effective use of COBOL.

Now, however, I'm happy to announce a COBOL book that teaches you how to use COBOL in the way that the best programmers in industry use it. The book is so effective that most people will be able to learn structured COBOL from it without any outside assistance. In fact, as you will see later, we guarantee it.

3 reasons why this book is effective

1. This book was written under the technical supervision of Paul Noll. Paul has been a software specialist and training manager for Pacific Telephone; he now consults in businesses throughout the nation; and he's manager of the COBOL group in GUIDE, an association of large IBM users. Paul has taken pains to see that the COBOL in this book is not only accurate, but that it also represents the practices that are currently in use in the best COBOL shops in America.

2. The educational approach used in this book has been adapted from a book called *Standard COBOL* by Mike Murach. This book has been used by more than 200 colleges and universities, by dozens of businesses for inhouse training, and by thousands of professionals for self-instruction. As a result, the method of instruction has been proven effective many times over.

3. Because we feel it's impossible to teach a student how to *code* structured programs without also teaching him how to *design* structured programs, this book gives extensive coverage to modern design techniques. In my opinion, this material is essential to learning structured COBOL, even though you won't find it in most competing books and courses.

What this book does

In brief, a student who completes this book will have the skills of an entry-level programmer in industry. In terms of COBOL, the book teaches a professional subset that includes JCL and COBOL for sequential files on tape or disk.

Because two sets of COBOL standards are currently in use (1968 and 1974), this book teaches a subset of the two that will run on either a 1968 or 1974 compiler. By using this subset, you won't have to modify the programs you write in 1968 COBOL when your shop converts to 1974 COBOL. If you are already using 1974 COBOL, this book prepares you for maintaining 1968 programs, converting 1968 programs to 1974 COBOL, and developing new programs in 1974 COBOL.

Since the emphasis of this book is on standard COBOL, you will find it useful no matter what system you're using. However, this book is specifically designed for users of DOS or OS on the System/360-370. In particular, it presents a programmer's subset of DOS and OS JCL along with the important IBM extensions to standard COBOL.

Related products for the experienced COBOL programmer

This book is part 1 of a two-part course in structured COBOL. Part 2, which is designed to teach advanced COBOL features, will be available in July, 1979. These books, however, fill only one of the training requirements for COBOL programmers.

The other requirement is to teach experienced COBOL programmers to use the new productivity techniques. For this purpose, Paul Noll developed a book called *Structured Programming for the COBOL Programmer*. This book is currently used by hundreds of companies for programmer training. And it can make programming more enjoyable at the same time that it increases productivity.

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Chicken Little Keeping Eye on Falling Skylab

By Tim Scannell
CW Staff

WASHINGTON, D.C. — Even though the National Aeronautics and Space Administration (NASA) insists the chances of getting hit with a piece of the falling Skylab are no greater than those of being struck by a speeding meteorite, two people here are preparing for the worst.

Alex Fraser and Sam Greenlaw, Washington, D.C.-based computer consultants, recently formed a unique monitoring and warning service dedicated to watching the slow decay of the Skylab station. For a monthly fee of $100, Chicken Little Associates will not only provide background material on the orbiting space station and advance notice of when the satellite can be seen in the early morning sky, but will also warn clients who may be in the 85-ton object's path when the Skylab begins to fall.

"Nothing this big has ever broken up in the atmosphere before in the 20-some-odd years things have been flying in space," Fraser said. "We want to let people know what's going to happen when this big beast breaks up and falls back to Earth."

Data From Norad

Chicken Little uses the tracking information fed through Nasa by the North American Defense Command (Norad) system in Colorado to keep tabs on the Skylab station. They input this data into a minicomputer whose data base contains the names and locations of their clients and the major cities that lie under the satellite's shadow.

Although Greenlaw declined to identify the type of minicomputer he and his associate are using or to go into details about the specific programming, he stressed that for the organization's fee of about $100/mo, the media, police departments and concerned individuals can't afford to be without the service.

Greenlaw believes that Nasa has been treating the whole Skylab affair "too damn lightly" and has misled the public by the information it has provided.

Aside from the obvious dangers posed by falling, multiton chunks of debris, another serious problem exists in the satellite's laminated glass solar panels, Greenlaw stated. If these panels shatter upon impact with the Earth's upper atmosphere, the light- and heat-reflecting shards of glass will probably float to the ground, doing little if any damage. But if they disintegrate at about 5,000 feet above the ground, then glass pieces will rain down at blinding speeds and possibly inflict heavy injuries, the computer consultant predicted.

"When the Air Force says it's imminent that the satellite will fall in the next few passes, we'll wire everybody who could be under it and let them know," Greenlaw explained.

The Chicken Little executives are not oblivious to the business side of their early-warning service. "We want to keep [the Skylab] an identified flying object, as well as build a public awareness of the possible dangers," Greenlaw stated. However, "if it does go down early, we're going to lose money, and if it doesn't we're going to make money."

Software, Services in Arizona Declared Intangible, Untaxable

By Marguerite Zientara
CW Staff

PHOENIX — Arizona has joined the growing number of states that have declared software and services intangible and therefore not subject to sales and use taxes.

The Department of Revenue enacted a regulation to that end, effective last November, apparently as a follow-up to the decision in *Honeywell vs. Maricopa County* [CW, March 6].

That decision, handed down in November 1977, ruled that the Maricopa County tax assessor unfairly discriminated against Honeywell Information Systems, Inc. (HIS) in assessing personal property taxes in 1973 against 39 pieces of DP hardware HIS leased to various users here.

According to the new regulation, income from the leasing, rental or sale of hardware is taxable since hardware is considered tangible, personal property. Most other DP transactions, however, have been exempted by the Department of Revenue.

Income from services rendered wholly or partly in connection with the sale or use of such hardware is exempt, including income from "the multiple use of hardware wherein no single customer has exclusive use of the equipment for a fixed period of time [time-sharing]" or where the customer "does not exclusively control all manual operations necessary to operate the equipment, or both."

Other Exemptions

In addition, income from "professional and technological services" such as classroom education; analysis, design and systems support engineering services; data conversion services; and "computer programs [software]' are exempt from taxation, according to the regulation.

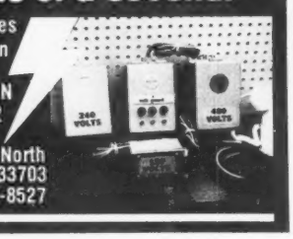
Income from transactions involving services rendered and including tangible property as "inconsequential elements thereof" is also exempt. Presumably, service bureaus are included in this classification.

The regulation states further that when taxable and exempt income are received together, the charges for each must be separately stated on bills or invoices "or otherwise clearly reflected in the books and records of the taxpayer." If they are not separately stated, the gross income from such transactions will be considered taxable.

In recent years, a number of states have changed their classification of software and services to intangible and therefore nontaxable, to greater and lesser degrees. Alabama and Tennessee have done so in court decisions, New York and New Jersey by means of tax commissions and Vermont and Ohio by legislative action. Florida made the change through an administrative hearing.

The Commonwealth of Massachusetts' Department of Revenue is presently preparing to promulgate rules.

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Could Hit Earth This Year

Nasa Trying to Pinpoint Skylab Collision Site

By Tim Scannell
CW Staff

WASHINGTON, D.C. — Despite countless computer-projected rescue attempts by National Aeronautics and Space Administration (Nasa) scientists, the Skylab satellite has submitted to the "what goes up must come down" law of gravity and is falling from its 300-mile-high orbit.

Victimized by overactive sunspots, dead batteries and a malfunctioning guidance system, the 85-ton orbiting workstation could pierce the outer reaches of the Earth's atmosphere as early as April and begin its fiery descent sometime in late 1979 or the beginning of 1980, according to Nasa spokesmen.

However, estimating the exact time of collision as well as pinpointing the actual impact area are two major problems facing space agency researchers.

Because of the uncertainty of conditions in the Earth's upper atmosphere and the awkward drag, or friction, characteristics of the space vehicle, scientists have been able to narrow down the impact "footprint" only to a 4,000-mile-long by 100-mile-wide area along Skylab's flight path. And although Nasa officials believe the satellite's reentry time might be predictable up to 12 hours in advance, those scientists have concluded that Skylab's collision site may not be known until about one hour before the crash (see story on Page 10).

Falling Debris

When the space station does "deorbit," more than 25 tons of debris — 400 to 500 pieces — will be scattered across 12% of the Earth's surface at speeds of up to 300 feet per second. Most of the Skylab remnants will drop into the ocean, Nasa claimed, but there is a one in 40 chance that a piece weighing 250 pounds or more will fall into a populated area.

Two sections of the falling satellite, the film vault and the air-lock shroud, weigh more than two tons each and are designed to withstand the high heat and friction of reentry — theoretically landing intact.

Nasa officials contend, however, that the plummeting space station — launched in 1973 to demonstrate that men can work and live in space for prolonged periods of time — poses no threat to human life or property because a large portion of the workshop will burn up as it collides with the Earth's dense atmosphere.

Constant Monitoring

Researchers are constantly monitoring the tumbling projectile through various "skin-tracking" or radar facilities around the world and relaying that data through two government computer centers — the North American Defense Command (Norad) complex in Colorado Springs, Co., and the Marshal Space Flight Center in Huntsville, Ala.

Both facilities provide a wealth of information on Skylab's position, speed and rate of descent as well as information on such phenomena as solar flares, which tend to expand the Earth's atmosphere and increase the satellite's deorbiting speed. The mountain-based Norad center, however, takes this tracking effort one step further by using a Philco 2000 computer, incorporating a Philco 212 processor, to project where and when the workshop might hit.

Skylab flight coordinates are entered into the computer along with weather conditions in the upper atmosphere and abnormalities in the space station's rate of spin. When all the variations are compared by the computer, statistics are printed out that list the satellite's probable point of reentry.

Norad also keeps statistics on the whereabouts and rate of decline of more than 4,500 other satellites, rockets and "junk" orbiting the Earth, a spokesman said. "There is a great deal of coordination between Nasa and other agencies," he noted. And "as we proceed toward [Skylab's] time of reentry, this activity will obviously be intensified."

Rescue Techniques

Meanwhile, Nasa has been experimenting with all sorts of techniques to save the falling metallic bird — from rescuing it with the nearly completed space shuttle to blowing it up before it hits the ground. Nasa has even considered attaching a teleoperator retrieval system or space booster to the station to push the Skylab further out into space or guide it to a specific point in the ocean.

None of these plans, however, are necessarily safe or economically feasible, a Nasa official said. The airplane-like space shuttle won't be ready for launch until early 1980; intercepting the falling Skylab with a missile and blowing it up would only spread the pieces further away, decreasing the "ballistic coefficient" and reducing the amount of burn-up.

In addition, the $26 million TRS "could not put the Skylab high enough to eliminate the possibility that it would become unstable again or guarantee that the station could be directed to an ocean area," the official noted.

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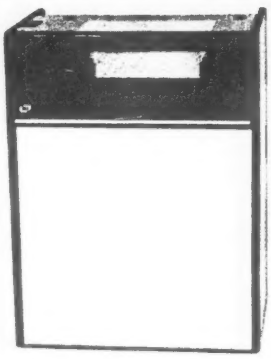
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New York City Anticipates Savings of $37 Million As MMIS Uncovers Fraud

By Ann Dooley
CW Staff

NEW YORK — A year-old Medicaid Management Information System (MMIS), designed to detect fraud in Medicaid payments here, has helped weed out 2.8 million improper claims for an expected savings of nearly $37 million in payments to Medicaid practitioners.

The automated system has proven so successful that Joseph Califano, secretary of the Department of Health, Education and Welfare (HEW), recently said he hopes all other states will use it as a model.

Speaking at a ceremony at which the system was certified, an act which indicates that federal requirements have been fulfilled — or, in this case, surpassed, Califano said the federal government would increase by $7 million a year its present $14 million share in the operating costs for the MMIS. The government will pay three-fourths of the cost instead of the current 50%, and New York State will pay the remainder.

Claims Total

Since the system was implemented in November 1977, it has cross-matched data on more than 28 million claims filed in New York City. Officials decided to use MMIS here before adopting it statewide because of the magnitude of the city's case load — 1.3 million — and the corresponding fraud problem.

MMIS should be fully implemented here by September and will be expanded to cover the entire state by December 1980.

All Medicaid billing information is entered into an IBM 370/158 that produces a summary comparison of all Medicaid practitioners. If a practitioner's billing data looks unusual, it is checked.

The system is programmed with edit routines to "hit" on a variety of potential abuses. These edits include a cross-check of the number of prescriptions dispensed and to which pharmacies. This way, "croakers" — physicians who prescribe drugs to addicts and then charge Medicaid for unperformed services — can be pinpointed, as can physicians who have seen an unusually large number of patients in a day.

System Phased In

Beginning with the processing and payment of Medicaid claims for doctors, the system was implemented in several phases. Since then, dentists, pharmacists, laboratories, outpatient clinics, inpatient hospital services and nursing homes have been phased into the system [CW, July 17].

In addition to the savings from rejected claims, the MMIS has made it possible to pay routine Medicaid claims in 10 days and more complex ones within a month. Before, it sometimes took up to six months to process claims.

This shortened turnaround time has encouraged more physicians and other providers to participate in the program. Before the automated system was implemented, only 4,275 physicians were enrolled in the Medicaid program; as of last October, the number was 10,123.

In the first year of its implementation, MMIS received 28,162,559 claims for services to Medicaid beneficiaries. The system granted payment on 19,447,740 claims and denied 2,806,152 claims. The $37 million savings mark is expected to be reached by March, and savings on such claims are expected to reach $100 million in its second year of operation.

The automated system has reduced total Medicaid pharmaceutical costs by controlling client misuse, identifying those clients who have health insurance in addition to Medicaid and reducing physician and clinic costs per service billed. It has also eliminated large numbers of duplicate claims, MMIS officials indicated.

By programming an automated review of this kind for all claims and by building a data file on Medicaid beneficiaries, MMIS is assuring that only legitimate claims will be reimbursed, according to Barbara Blum, commissioner of the State Department of Social Services. "Medicaid will service its clients better because of MMIS," she said.

Drug Problem

Blum gave an example of the system's effectiveness. An edit routine singled out clients whose patterns of Medicaid card use showed they purchased an unusually high amount of drugs.

Medicaid authorities limited benefits by allowing these clients to choose one pharmacy at which to receive prescription services. In three months, their average monthly Medicaid bills for prescriptions dropped from $212.80 to $15.90, a monthly savings of almost $200 per client, she noted.

The on-line bill-paying system which currently processes the 100,000 daily claims is run by Bradford Administrative Services, a subsidiary of Bradford National Corp.

City and Medicaid officials appear to be very pleased with the quality of service and the system efficiency provided by Bradford. They have contracted with the company to perform the second phase of the project, automating the rest of the state's Medicaid program.



'John, Don't You Think Your Personal Computing Kick Has Gone Far Enough?'

NSF Allocation for DP Research Up 10.9%

Washington Update

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – The National Science Foundation (NSF) 1980 budget includes $19.3 million for computer research, a 10.9% increase over this year's projected expenditures.

The money will go for expanded research on "the further miniaturization of magnetic memory systems," integrated circuits and other areas such as microsystems architecture and modeling.

The total 1980 budget for NSF is $1.006 billion, an increase of $77.6 million, or 8.4%, above the $928.4 million 1979 program.

"The 1980 budget increases reflect the fact that the President and his advisers clearly recognize that basic research is an investment in the nation's future," NSF Director Richard C. Atkinson said.

Data Base Backs Budget Studies

Proposed cutbacks in many government program areas under President Carter's $523 billion 1980 budget have drawn sharp protests from a number of congressmen, who predict the budget will undergo extensive alteration before final approval.

But while the budget may be in for rough going on Capitol Hill, Congress' deliberations will be made just a little easier this year by an addition to its on-line data base. "Questions and Answers on the President's Budget" is a new table of the Members Budget Information System, part of the House Information Systems service available to congressmen through terminals located in their offices.

The table will provide "the President's proposed deficit and compare it with last year's Presidential and congressional deficits, as well as answer questions about specific program reductions, economic assumptions and long-range budget goals," according to Rep. Paul Simon (D-Ill.).

Justice Supports New EFT Rules

The Department of Justice has announced support of a Federal Deposit Insurance Corp. (FDIC) proposal to simplify its electronic funds transfer (EFT) rules for FDIC-regulated banks.

Current regulations require banks to apply to FDIC for approval for each EFT terminal and to publish a notice in a newspaper in the community that will be served by the terminal.

If several banks share an EFT network, they must file multiple applications and publish multiple notices for each terminal.

The proposed regulations would simplify these requirements, the Justice Department said. A bank regulated by the FDIC would file one application when it obtains its first terminal.

After receiving approval, the bank could add terminals if the FDIC did not object within 30 days after receiving notice of the additions and the institutions that would be sharing them. In addition, a bank's customers could have access to another institution's terminals without their bank having to file an application or publish a notice, the Justice Department said.

John H. Shenefield, assistant attorney general in Justice's Antitrust Division, praised the proposal but said the department is concerned about the FDIC's failure to indicate under what circumstances it might reject a bank's application to offer its first EFT terminal or prevent a bank from expanding its EFT system.

Shenefield urged the FDIC not to accept the mere filing of a "Notice of Intent to Protest" by a bank's competitor as grounds for delaying activation of the bank's terminals.

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Biologist's Research Sheds Light on Man's Age

By Brad Schultz
CW Staff

LOS ANGELES — The human genus may be 10 times older than previously thought and in prehistoric times may have included several lines of descent, only one of them culminating in modern man, according to computer-based research here at the University of Southern California (USC).

A number of human species may have existed side-by-side during the past five million years, according to USC biologist and graduate school dean Charles E. Oxnard. But long before civilization began, all species mysteriously died out except those creatures from whom we are descended.

Oxnard is confident that humanity is at least five million years old and believes age estimates may climb to 18 million years as computer technology and statistical methods are used to analyze fossil remains.

How Civilized Is Man?

These age estimates have important implications, according to Oxnard. One is that anthropologists have overemphasized the role of genetic factors in determining such human traits as aggression.

The orthodox view holds that culture and tradition "represent a very thin veneer of civilization on a heavy bedrock of prior animal behavior and prior animal genetic makeup," Oxnard observed. That view rests on age estimates of only a few hundred thousand years — a very small segment of the time higher apes have existed — and has been challenged as a result of fossil discoveries in recent years.

The 10-fold jump in the estimated age of the human genus indicates that this "veneer" is instead "a very thick sludge of human social and cultural influence laying on a very thin bedrock of prior animal behavior and genetics," Oxnard maintained. The revised estimate also hints that aggression — as one basic human trait — is far more subject to psychosocial factors than previously supposed.

Studying Anatomy

Oxnard is following the evolution of computers while studying the evolution of man. Nearly 20 years ago, he began to apply automated techniques in his native England, using a vacuum-tube system called "Elliot" at the Rothampstead Experimental Station.

It took Elliot about three weeks to execute the data analysis programs Oxnard wrote in machine language in conjunction with comparative anatomy studies. Elliot's limited memory capacity often forced Oxnard to enter only half a program at a time.

Today, USC's IBM 370 facilities can handle the same analysis algorithms, implemented in Fortran, in about two minutes, Oxnard said.

During the past dozen years, Oxnard and his associates have used computer technology in the laboratory to define how the anatomical structure of contemporary primates allows the animals to perform various functions. Applied to fossil specimens found by field researchers, this understanding generates ideas about what functions the fossilized creatures performed when they lived.

Better Than Dissection

Biologists have come to realize that better techniques exist for learning the relationship between animal structure and function than dissection alone, Oxnard said. Several years ago, multivariate statistics were employed to measure structure; with this approach researchers needed computer systems to process the mass of data involved.

In recent years, the scientists have used computer technology, optical scanning equipment and various types of mathematical functions to describe the geometry of contemporary specimens.

Central axis functions describe the external structure of an animal's anatomy in terms of an internal, hypothetical axis: for example, the arrangement of fingers about an axis drawn down the middle of an ape's forearm.

Using another approach, laser beams are trained on the animal. The shadows and contours that result as the beams sweep the animal's skeleton are described by Fourier transforms — a class of mathematical functions — that are monitored on oscilloscopes. An alternative application of Fourier analysis involves direct input of the transforms to a computer system.

Oxnard's Conclusion

With these techniques, Oxnard concluded that scientists have been wrong in assuming that fossils of foot bones discovered in 1960 at Olduvai, Kenya, are those of creatures from whom modern man is directly descended. Instead, those creatures — known as australopithecines — evolved parallel to, but not as part of, the only human lineage that has prevailed.

Australopithecines were not ground-dwelling apes that normally walked on two legs, Oxnard found. Since forebears of modern man did live on the ground and walk on two legs well before australopithecines appeared, Oxnard contends that current humans could not have descended from the latter.

The Olduvai creatures were primarily tree-dwelling, climbing apes, Oxnard believes. It is not known whether they were in some sense "human" or the ancestors of modern primates other than man, such as orangutans.

'Lucy' Suggests Opposing View

By a CW Staff Writer

CLEVELAND — Man may have appeared in the ape family only a few million years ago. That view, in opposition to age estimates as high as 18 million years for humanity, was recently given here by Donald C. Johanson, research director at the Cleveland Museum of Natural History, and Timothy White, a University of California anthropologist.

Johanson and White analyzed the fossil remains found in 1974 of an adult female creature dubbed "Lucy," who purportedly died of arthritis about three million years ago. Lucy was more ape-like than human in appearance, but did have the uniquely human characteristic of walking on two legs.

The scientists surmised that both the forebears of modern man and a separate human lineage descended from Lucy's species; the separate line became extinct well before human civilizations arose.

There is no disagreement about Lucy's age, which can be reliably measured with radioactive-measuring techniques. But in terms of evolutionary time, Johanson and White have speculated that Lucy dined on turtle eggs and crab claws not very long after the split between man and the other primates occurred.

Most scientists involved in the study of evolution — one of whom is University of Southern California's Charles E. Oxnard — would place Lucy at least 10 million years after the split. There is little evidence at present to support either view, Oxnard said, but computer technology eventually may help solve the mystery.

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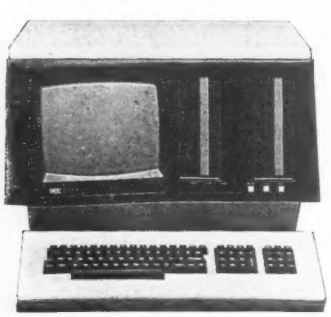
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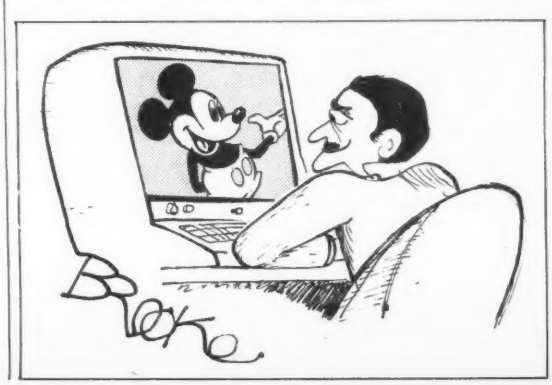
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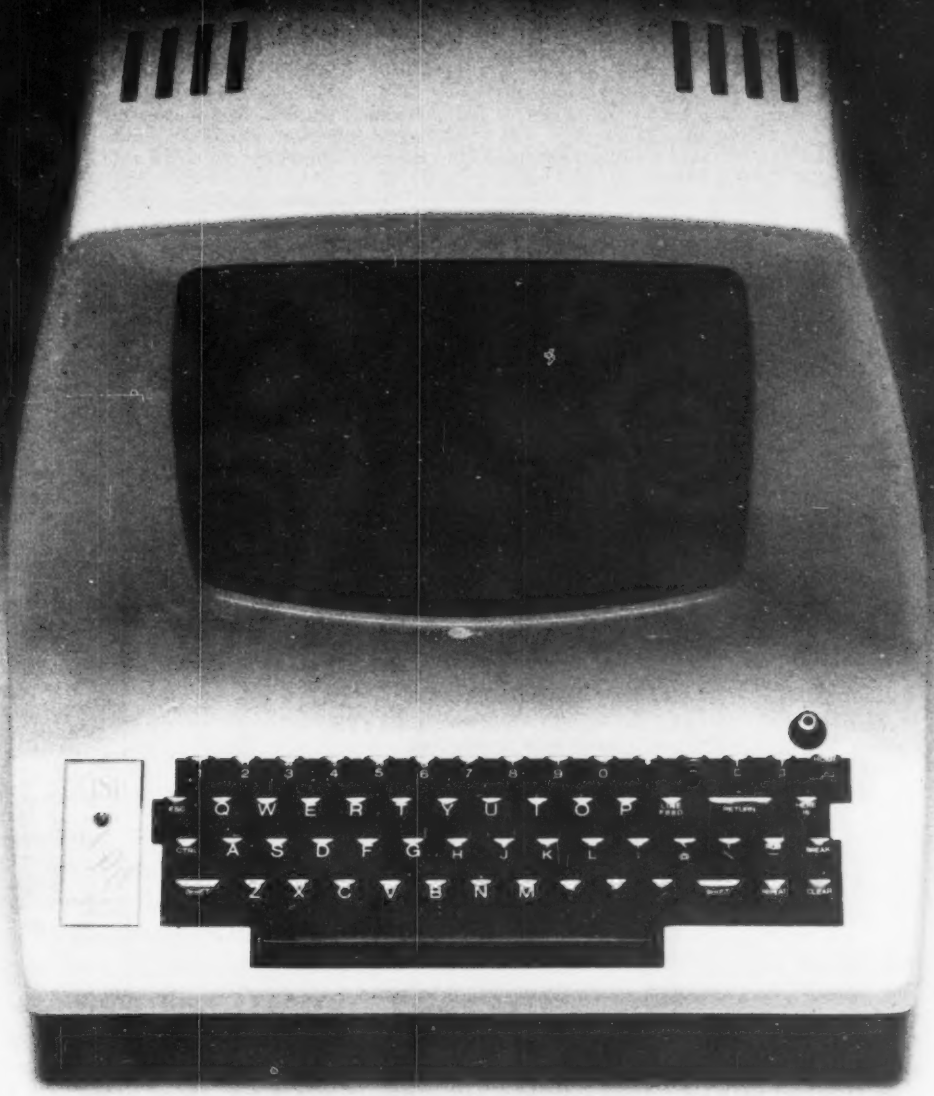
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State, Federal Tapes Matched

Massachusetts Probe Uncovers Tax Delinquents

By Jay Woodruff
CW Staff

CAMBRIDGE, Mass. — Preliminary findings from a computerized match of state and federal taxpayers here led state officials to as many as 2,000 persons who lived in Massachusetts from 1973 to 1976 and may have failed to pay certain state taxes.

Those individuals could owe the state as much as $1.5 million in unpaid taxes, according to Robert Cordy, first deputy commissioner at the Office of Special Investigation and Inspection at the Massachusetts Department of Revenue. The matching program has already brought in $600,000 in overdue payments.

State officials are not yet calling the delinquent taxpayers scofflaws, however. The officials believe some of the money owed is unpaid tax on savings bank interest, which only became taxable in 1971. "A lot of people were not aware of the state law, especially those who did not have accountants," Cordy explained.

The matching program is being run in cooperation with the federal government, which provides records of federal taxpayers with Massachusetts addresses on magnetic tape under the Federal/State Agreement on the Coordination of Tax Administration.

In a pilot project known as the Dividends and Interest Program (DIP), two tax agents worked for eight months to determine whether those people who did not file the savings bank tax were aware of it and to urge them to pay.

Comparison Inconclusive

The state then expanded the program's scope to cover a wide variety of items that taxpayers claim on the federal forms but not on the state form.

The initial step was to compare the list of all the federal filers from Massachusetts with that of all the state filers for the years 1973 to 1975.

The comparison was inconclusive because of errors, some of which resulted from the state's switch from keypunch to key-to-disk equipment in 1974 and from incorrectly entered Social Security numbers, Cordy said.

"However, we ran another match between the 1976 federal tape and the 1976 state tape, which was pretty accurate, and we got a manageable, reliable list," he noted.

Once the 1976 tapes had been matched, it was possible to go back to the tapes from 1973 to 1975 to get an accurate list of those individuals who had not filed properly, according to George Osganian, a deputy commissioner in charge of DP at the State Revenue Department.

The older tapes were corrected based on the 1976 tapes, and the state then generated a list showing that the same persons who had not filed in 1976 also had not filed in the three previous years.

After the list was generated, it was given to a group of officials in the income tax bureau. The group contacted individuals on the list to determine why they had not filed and often found those individuals were not aware of a specific tax, Cordy said.

Because the list does not distinguish certain exemptions, the group is responsible for checking those exemptions before approaching a taxpayer for an explanation.

"Optimistically, I anticipate another $900,000 [to be collected from the list], and we can also contact people to remind them to file in the future," Cordy said.

The revenue department expects to make the matches between federal and state tapes a "permanent part of our program each year," Osganian said.

Taxpayers should not expect to find out about their transgressions soon, however. The 1977 federal tape just became available, and the revenue department does not expect to run a comparison between that tape and the 1977 state tape for some months.

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GE Design Takes Cake

CINCINNATI — Anyone worried about the supposed lack of pioneering spirit in the U.S. will be relieved to know that General Electric Corp. (GE) applied high technology to the design of what may be the world's longest cake.

The 100-yard-long pastry was designed on a graphics terminal by engineer Clifford Hall of GE's Evendale plant here to celebrate the company's 100th anniversary and the plant's 30th anniversary.

The confection features six-foot panels, each depicting important parts of company history. Decorations on the cake, which was baked by ARA Services, Inc., ranged from a portrait of Thomas A. Edison to nuclear submarines, light bulbs and jet airplanes.

This was one GE product that was not designed for long service. The result of three months of effort that went into its design and manufacture was quickly eaten by the plant's 13,000 employees.

Global Study of Earth's Atmosphere Under Way

By Tim Scannell
CW Staff

WASHINGTON, D.C. — Last month, the United Nation's World Meteorological Organization (WMO) and the nongovernmental International Council of Scientific Unions initiated a one-year, multinational study of the earth's atmosphere.

Involving 149 nations and some of the world's most sophisticated scientific computers, the Global Weather Experiment (GWE) is an attempt to gather and assimilate every available morsel of meteorological information in a vast network of airborne and ground-based observation systems, according to Dr. Wayne McGovern, science coordinator for the National Oceanic and Atmospheric Administration (NOAA).

NOAA, along with the National Science Foundation, the National Aeronautics and Space Administration and the U.S. departments of Defense, State, Transportation and Energy, is picking up one-third — or $93 million worth — of the project's more than $300 million in expenses.

Basically, "we're trying to give the earth's atmosphere the best physical it ever had," McGovern stated, simplifying the purpose of the complicated study.

Weather Forecast Extension

Based on proposals made by President John F. Kennedy to the United Nations in the early 1960s, the worldwide experiment actually seeks to extend the present limits of weather forecasting from the current five or six days to 10 or more.

Currently, the World Weather Watch (WWW) — an observational program launched in 1962 as a precursor to the more extensive GWE — provides more than 40,000 different weather statistics each day and is the basis for existing global weather forecasts.

However, this system only monitors about 15% of the earth's atmosphere and is therefore limited by any uncharted weather patterns that might occur in the remaining areas of the globe, McGovern said. This can occur particularly in the southern hemisphere and in Southern portions of the earth's equatorial belt.

By independently testing each of the observational techniques used in the experiment and screening out those that don't add much to the final forecasting product, GWE scientists hope to decrease some of the high costs associated with obtaining accurate and timely meteorological reports. For instance, the WMO estimates that it takes at least 200 specially equipped weather ships working around-the-clock to completely blanket and report on weather conditions in the tropics.

However, the cost of such a full-time project is estimated to run as high as $2 million a year for each ship. This makes such an endeavor financially impossible, McGovern noted.

In addition, GWE results will enhance current computer modeling techniques by refining the numerical input used to generate forecasting models. Calculated by these models, long-range weather forecasts could conceivably help farmers to determine the right time to plant their crops, allow cities and towns to prepare for impending storms and substantially aid both the construction and the transportation industry, McGovern said.

"You can't really understand a physical process if you don't have any information which describes it," McGovern added. "This type of experiment will give the kind of information which starts to allow us to observe what various processes are doing and ways we can simulate them on computers."

Processing Centers

The mountains of data transmitted from hundreds of observational transmitters and stations around the globe will initially be processed by DP centers in Washington, D.C., the UK, France, Finland, Australia, West Germany, Japan and The Netherlands. However, the bulk of the construction-type processing, which will aid in the assembly of a final data set, will be performed at bases in Sweden and the USSR, McGovern said.

The refined data from these two stations will then be transmitted to the European Center for Medium-Range Weather Forecasts in Bracknell, England, and the U.S. Geophysical Fluid Dynamics Laboratory (GFDL) in Princeton, N.J., for further assimilation and various "internal consistency" checks.

At the Bracknell and Princeton facilities, scientists will reportedly use the "number-crunching" capabilities of a Cray Research, Inc. mainframe and a Texas Instruments, Inc. Advanced Scientific Computer (ASC) system, respectively, to process the weather data at rates of up to 80 million instruction/sec.

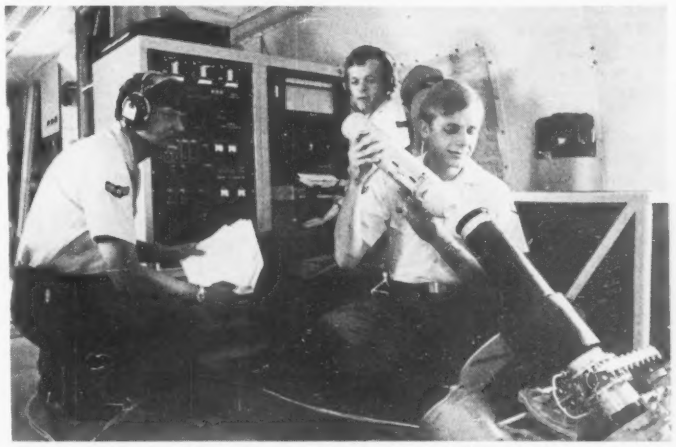
Airborne, Floating Instruments

The upper levels of the atmosphere are analyzed by both ballooned rawindsondes, which transmit signals detailing temperature, pressure and humidity (until they rise to their bursting point), and missile-shaped dropwindsondes that are released by aircraft flying over designated areas and transmit the same information back to a central location, McGovern stated.

From the far-flung southern oceans, drifting buoys will measure the atmospheric pressure a few feet above the sea's surface and keep a constant check on the water temperature. A number of isolated regional experiments will collect data from such meteorological phenomena as the Asian and West African monsoons and the polar "heat sinks" which greatly contribute to global weather patterns, McGovern added.

A network of orbiting and geostationary satellites will relay most of the data from the floating and airborne weather instruments and provide additional input by collecting radiational data, wind speed measurements and readings on ozone content and distribution in the earth's atmospheric layers.

In all, the experiment will involve more than 50 research ships, 110 specialized and commercial aircraft, 300 instrumented buoys, 300 high-altitude balloons and nine satellites, McGovern said. A variety of information will also filter into the study from the 3,400 land stations, more than 7,000 merchant ships and 1,000-plus specially rigged commercial aircraft already intermittently associated with the WWW.



Air Force crew members prepare to launch a dropwindsonde which will report atmospheric data during its journey to earth.

"Each nation contributes either some part of the observing system or some part of the data processing or data storage," McGovern noted, commenting on the remarkable cooperation each nation's representatives have given to the project.

Unfortunately, a diplomatic problem has already plagued the international weather project and threatens to hamper at least some portions of the data collection procedures.

Concerned about handling the vast amounts of data generated by the hundreds of observing stations, the USSR wanted to purchase a Control Data Corp. supercomputer from the U.S. However, the proposed deal was squelched on the grounds of national security, according to an informed source.

"We do know that the USSR needs large computer systems to participate in this experiment because of the large amounts of information which it has to put into a special format," science coordinator McGovern observed. "And we're concerned that they will not be able to do it."

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Calendar

Feb. 28-March 2, Washington, D.C. — **Data Processing: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 14-16 in Dallas and March 26-28 in Chicago.

Feb. 28-March 2, Los Angeles — **Data Base Management Systems — A Comparative Analysis of General-Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 7-9 in Dallas, March 14-16 in Chicago and March 28-30 in New York.

Feb. 28-March 2, Dallas — **Distributed Systems: Are They Right For You?** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 5-7 in San Francisco and March 19-21 in Chicago.

March 1, Anaheim, Calif. — **California Computer Show.** Contact: Norm De Nardi Enterprises, 95 Main St., Los Altos, Calif. 94022.

March 1-2, Philadelphia — **Minicomputers and Small Business Computers: Selection and Usage Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 15-16 in Chicago.

March 5, Washington, D.C. — **Annual Meeting of the Computer Law Association.** Contact: Michael Yourshaw, Suite 1100, 1776 K St. N.W., Washington, D.C. 20006.

March 5-6, Washington, D.C. — **Managing Software Projects.** Contact: American Institute of Aeronautics and Astronautics, P.O. Box 91295, Los Angeles, Calif. 90009. Also being held March 8-9 in Boston.

March 5-6, Boston — **Software Cost Estimating.** Contact: American Institute of Aeronautics and Astronautics, P.O. Box 91295, Los Angeles, Calif. 90009. Also being held March 8-9 in Washington, D.C.

March 5-7, Washington, D.C. — **Data Base Management Systems for Minis: A Comparative Analysis.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 28-30 in San Francisco.

March 5-7, San Francisco — **IBM - The Next Five Years.** Contact: Infotech International, Inc., 234 E. Colorado Blvd., Pasadena, Calif. 91101.

March 5-8, Woburn, Mass. — **16-Bit Microcomputer Design and Mini/-Microcomputer Comparison Seminar.** Contact: Institute for Advanced Professional Studies, One Gateway Center, Newton, Mass. 02158.

March 5-8, Orlando, Fla. — **Seminar on Data Communications and Teleprocessing Systems.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

March 5-9, San Diego, Calif. — **Use, Inc. Spring Conference.** Contact: Use, Inc., Box 461, Bladensburg, Md. 20710.

March 6-9, Miami Beach, Fla. — **Workshop on Advanced Planning and Management Systems in Education.** Contact: Cause, 737 29th St., Boulder, Colo. 80303.

March 7-9, Chicago — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 28-30 in Washington, D.C.

March 7-9, Chicago — **Data Base Management Systems: General Concepts and Planning Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 21-23 in Dallas.

March 7-9, Houston — **Integration of Word Processing and DP Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 28-30 in Chicago.

March 7-9, Washington, D.C. — **Tomorrow's Networks.** Contact: Technology Transfer, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

March 7-9, Washington, D.C. — **13th National Data Processing Security Seminar.** Contact: Director of Seminars, Data Processing Security, Inc., 235 N.E. Loop 820, Hurst, Texas 76053.

March 11-14, Houston — **Conference on the New Nationwide Interregional Exchange Capability, "The Era of Challenge."** Contact: Garry Singer, National Automated Clearing House Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

March 12-14, Boston — **Queueing Systems.** Contact: Technology Transfer, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

March 12-14, Washington, D.C. — **DP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 26-28 in Houston.

March 12-14, Washington, D.C. — **Implementing Cryptography in Data Processing & Communications Systems.** Contact: Seminar Registrar, Ketron, Inc., 530 E. Swedesford Road, Wayne, Pa. 19087.

March 14-15, London, England — **Data Communications for Retail Management.** Contact: Information Studies Ltd., Regal House, Lower Road, Chorleywood, Rickmansworth, Herts WD3 5LQ, England.

March 14-16, Chicago — **Word Processing: Guidelines for Planning, Design and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 28-30 in New York.

March 14-16, Washington, D.C. — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 21-23 in San Francisco.

March 14-16, Tampa, Fla. — **12th Simulation Symposium.** Contact: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

March 14-16, Las Vegas — **TBA Conference,** sponsored by General Automation Users Group Exchange. (Gauge).' Contact: Martha Gibbs, Administrator, P.O. Box 4724, Anaheim, Calif. 92803.

A Look Ahead

WASHINGTON, D.C. — The 1979 Federal Computer Conference, which last year attracted more than 6,000 people for a combined total of 33 workshops, special sessions, tutorial seminars and working luncheons, will be held Nov. 6-8 at the Sheraton-Park Hotel here.

More information is available from the Federal Computer Conference, P.O. Box 368, Wayland, Mass. 01778.

Call for Papers

INTERNATIONAL MEETING ON MAGNETIC RECORDING ON PARTICULATE MEDIA, Villa Alba, Gardone Riviera (Brescia), Italy, Sept. 10-11.

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Abstracts must be received by March 27.

Further information can be obtained from A.R. Corradi, Sonorex S.p.A., Via Bonfadina, 14, 25046 Cazzago S.M. (Brescia), Italy.

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Book Assesses Technology

OECD Compiles 15 Studies

WASHINGTON, D.C. — The Organization for Economic Cooperation and Development (OECD) has published a 290-page book devoted to the *Social Assessment of Technology — A Review of Selected Studies.*

The studies reviewed in the volume evaluate the experience of OECD member countries in the social assessment of such broad subjects as communications and computer technologies, transportation, energy, urban development, environment and working conditions.

Fifteen studies were chosen from published material received by the end of 1974 because they were "based on at least some of the features expected to characterize studies of social assessment of technology as defined in previous OECD work," according to an OECD spokesman.

Included in the selected studies are "Communications Technology for Urban Improvement," "Economic Losses Arising From Computer-Based Systems," "Branching Out in Computer-Communications Developments" and "The Video-Telephone."

The evaluations are expected to shed light on aspects "of prime and practical interest to both the analysts and sponsoring agencies of the studies or potential users," according to the spokesman.

The evaluations cover the categories of management, methodology of the analysis, technology, social-political-economic trends (contextual scenarios) and impacts and policy.

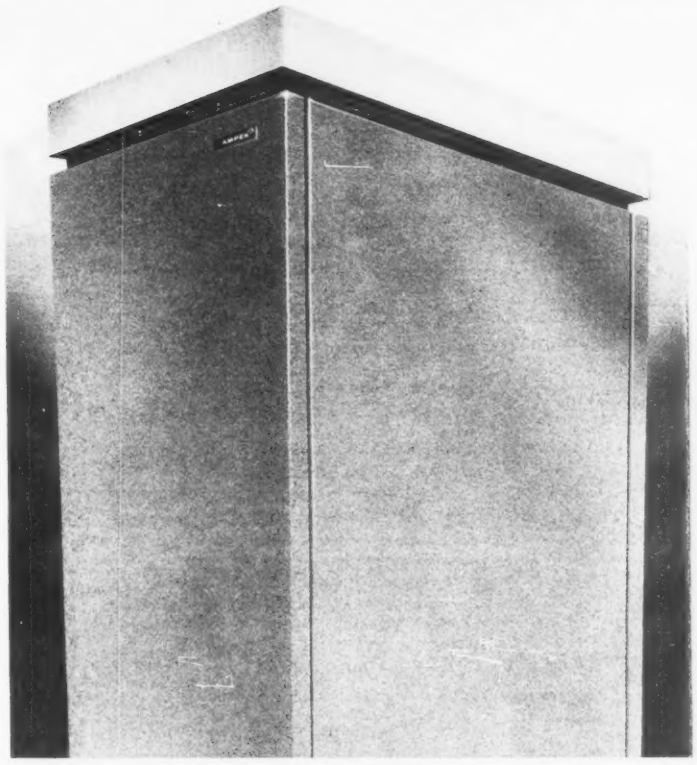
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Editorial

Blind Faith

Since World War II, there has been a shift in the focus of reform-minded city administrators that has created many jobs for DP professionals and a ready market for the computer industry.

A half-century ago, the primary concern of reform efforts was how to improve government structure. Planning departments were introduced, and many cities hired professional administrators to supervise municipal agencies and functions.

During the past three decades, however, city reform has focused on technological change. City officials have clearly welcomed the advice of management scientists, and virtually all major cities have automated various operations.

The officials expect computing to boost efficiency, lower costs and improve service to citizens. But for most U.S. cities, these benefits have not materialized to the extent anticipated, according to the Public Policy Research Organization's Urban Information Systems (Urbis) Research Group [CW, Jan. 29].

While computing gives mayors, city managers and department chiefs access to data of a highly technical quality, the data is only partly helpful, Urbis concluded. Moreover, computer systems have made many city governments more expensive to run.

Worse yet, computing has reportedly made many city agencies less responsive to the demands of citizens. "While the computer has made some things easier for city staff, like handling routine citizen requests for information, it has also increased the number of things the staff must do," Urbis found.

Bills, notices and other computerized documents are more difficult for the public to decipher. Errors in these records are more difficult to detect and correct, Urbis added. The researchers found strong agreement among city administrators that citizen complaints generally relate to agency computer foul-ups.

According to Urbis, many well-meaning city officials have become overly infatuated with "computing power," reflecting America's tendency to believe technology can solve all governmental problems.

Moreover, urban technology seems self-perpetuating. "The most common approach of technical experts to local government problems is to pursue a technological fix even if the problems are generated by technology," Urbis explained. "Not surprisingly, then, problems with computing are often approached by advocating the further development of the technology. A common claim is that 'the payoffs are just around the corner.'"

There is ample evidence to support the view that government at all levels has automated in blithe ignorance of computing's impact on people and organizations. Some bureaucrats are fanatical in their conviction that computing is a cure-all.

This blind faith in technology possibly accounts for the astonishing scarcity of such research as the Urbis study. After all, cities have been automating for more than two decades.

Public administrators cannot afford to ignore the Urbis study and should hope that more investigations of this type will follow.



Letters to the Editor

The Other Side

I was very disappointed in the one-sided "ACLU Files to Halt Mandatory ID Cards" [CW, Jan. 15]. I would like to tell the other side of the story.

The homicide, the way you tell it, really makes the ID card law sound like a police state idea. The ID card law is a good idea if you tell the whole story of the homicide, which was the straw that broke the camel's back.

A convenience store outside of Morgan City, La., was robbed one day and the suspect took the female employee and a male customer with him. Shortly after they left, another customer came to the store, became suspicious and called police.

In their efforts to find clues, the police were contacted by someone who had passed by the store around the time the crime was committed and gave a vague description of a car parked out front.

The police located a car that fit the description at a shack behind a welding shop and got a court order to tap the phone. Because of the phone tap, there was enough evidence to get a search warrant.

When the police arrived, the suspect had left. The police searched the suspect's shack, where he lived, and found evidence that the two people from the store had been there. They found hair clippings, clothes and blood stains where the suspect apparently tied them up and stabbed them to death.

The police found the female's body in the septic tank behind the shack. They later found the male's body in a sugar cane field close by.

The police put the description and the license number of the car on the National Crime Information Center network.

A detective in Washington State saw an advertisement for a used car for sale. He wanted to buy the car and, out of habit, ran a routine license check.

He found the car's owner was wanted in Louisiana for questioning about a homicide. The police in Washington went to arrest the man and a gun battle started. The suspect died from a wound from a small caliber firearm.

After a further search of the suspect's car and the place where he lived, more evidence was found linking him to the two bodies from the store.

To quote *Computerworld*, "the suspect's guilt could not be determined since he was later killed while resisting arrest in another state. Even so, local residents strongly supported passage of this measure."

It is easy for a person to hide from the police and other officials while down in the Morgan City area. In that area, one can get a job making top money. Most, if not all, companies do not check references for employment, and most companies do not check and verify Social Security numbers.

One can get a job and go offshore and live and work on a "rig," which is like a small town. In my opinion there is a lot of the "wrong kind of people" residing in the St. Mary Parish area.

The next time you print an article, I hope you get all of the facts.

David A. Biles

Cheneyville, La.

Tilting at Windmills

Lord save us! (Pun intended.)

I have just read "United California Bank Blames Jam on Computer" [CW, Jan. 22] by Kenniston W. Lord.

Lord's only significant sentence in the piece was the question, "Do we tilt at windmills?" We are compelled to reply, "Yea, verily. In truth, thou art a windmill."

F.J. Bridge

York, Pa.

Data Past

Five Years Ago
Feb. 6, 1975

EL SEGUNDO, Calif. — Xerox Corp. took a step toward distributed processing by switching to multiple processor architecture in its newly announced 550 and 560 mainframes. While the 550 was designed for real-time scientific environments, the 560 was a virtual memory-oriented, general-purpose mainframe that ran under the CP-V operating system used in the Sigma series.

WASHINGTON, D.C. — President Nixon ordered another review of the privacy question in his 1974 State of the Union message. It was thought that the "extensive cabinet-level" review of the subject might receive more attention at the highest levels of government than either the National Academy of Sciences report or the Department of Health, Education and Welfare report as the President tried to overcome the image of one who cared not enough about the privacy of individuals.

Eight Years Ago
Feb. 10, 1971

WASHINGTON, D.C. — This year marked the 20th anniversary of Universal Automatic Computer No. 1, Univac 1, whose "bones" lie at rest in the Smithsonian Institution. Pacific Mutual Life Insurance Co. and the Arizona Public Service Co. were early users of the system.

ANAHEIM, Calif. — The first national computerized credit bureau was announced, and plans called for it to be ready for operation in March. TRW Credit Data combined all of its 30 million files into one IBM 360/50 here and planned to service its other seven offices (including New York, Chicago and Detroit) by remote links.

The Human Connection

An Open Letter to DP Users

By Jack Stone
Special to CW

Dear User,

It's straight talk time — time for a discussion of how we DPers view your contribution to the DP systems activity.

What prompted this message was the most recent outburst of catcalls, Bronx cheers and boos I received when, during a lecture before an end-user audience, I asked the question, "What's your opinion of the DP department?"

Well, I kept my cool, but I did make some rather strong comments to the group relative to DPers' opinions of end users. This column is a recompilation (or cleanup) of what I told the group.

(As an aside to the DPers, I know I am not a duly elected spokesman for the community and that, try as I will to represent majority opinion, many will not agree with my assessments. Nevertheless, I'm going to speak my mind and hope I won't antagonize too many DPers along the way.)

User Maladies

First, I think you users suffer from the insidious malady known as "Star Wars Syndrome." You continue to be dazzled by the majesty of space-age science fiction and expect incredible capabilities to be installed in your information systems, including such time-critical systems as the annual picnic accounting application.

You are enchanted with the accuracy with which Luke Skywalker was able to launch his laser-guided torpedo against the alien forces and forget that the accuracy of the paychecks is strongly dependent upon a horde of data entry personnel who are being paid just a cut above the minimum wage.

Generally, you expect incredible speeds from us because we work in millionths of seconds time scales — or at least our machines do — but you don't appreciate the agonizing detail involved in the design and construction of a system. And it takes a long, long time to put a high-quality system on the air.

Sometimes, I note in you the symptoms of "I Meant to Say" (IMTS) memory failure. This malaise only evidences itself after you have signed off on a set of systems specifications and we are nearly finished with the programming phase of the development project.

It takes the form of an overly pleasant phone call from you after you've examined preliminary output. You tell us that your inventory stock items really number 50,000, not 25,000 or that the Julian date field should be expanded to accommodate the 21st century.

DPers Flattered, But. . .

With regard to changing needs, some say users are simply not capable of conceptualizing all their system requirements at one (early) point in time. Others claim users change their minds solely to irritate the DP department.

But I feel the reason users always seem to change is because they have this ingrained faith that we DP types are experts at mental telepathy and, through a combination of intuition, magic and mind projection, we always know what the user's needs are — with infinite precision.

We certainly appreciate this testimonial to our intellectual prowess, but we much prefer you take the time in the beginning to analyze the system specifications very carefully and validate them then. It would save us a lot of time and you a lot of money.

We are also concerned with the user community's seeming lack of exploitation of available technology that would aid in the control of their information system activity. We often wonder if you are aware of the modern, hand-held electronic calculator or, for the less sophisticated, the slide rule or even the abacus?

These devices share many attributes, among which is, pardon the jargon, the built-in addition function. This capability allows you, for example, to sum the estimated times for all the processing functions to be performed during the information processing cycle to obtain a realistic estimate of turnaround time, as opposed to using printer speed alone.

Modern versions of these systems also contain the built-in multiplication function, which is quite useful in seeking answers to the penetrating question, "Why does it take so long to run my job?" For example, if our system can process one of your records lickety-split in .36 seconds, even the abacus would quickly tell you that your 100,000-record file could not be processed in much less than 10 hours.

Users 'Own,' DPers 'Author'

Finally, I want to comment on the subject of systems ownership and try to put this issue in perspective once and for all. The system is yours, not ours.

All our continual harping and calling for your participation, your involvement, during the systems development process is our attempt to get you to accept all the responsibilities that go along with ownership — systems spec, integrated testing, training and so forth.

We truly pride ourselves as members of a highly productive service organization whose sole mission is to help you get your system on the air. Sure, we do much of the detail technical work, but we really only savor the fruits of authorship, not ownership.

And we all seek that ultimate psychic payoff which has eluded nearly all of us to date, that wonderful feeling that occurs at turnover time when you tell us with sincerity, "Hey, guys and gals, you did it! This is the system I need, and I accept it with a heap of thanks."

Cordially,
Jack Stone

The Taylor Report

How Well Are You Protected by Contract?

By Alan Taylor
Special to CW

NCR Corp., whose computer contracts recently have come under scrutiny in this column, believes my focus on its Universal Agreement alone has been too narrow. "These matters should be discussed in an industrywide framework," an NCR spokesman told me (CW, Jan. 29).

A computer user's attorney, who is not involved with NCR, suggested it would be helpful to compile a comparative list of provisions that various vendors have agreed to include in their printed form contracts. Then users could see how far each vendor is willing to go.

Four major areas must be considered in contract reviews:

- How much the user understands.
- How much protection he gets.
- How easy it is to get protection in theory.
- How easy it is to get protection in practice.

The reader questionnaire (See Page 24) covers each of these areas and asks for additional comments from readers. Please fill out the form, even if you can only partly do so.

For instance, most people have not had to force contract disputes to the bitter end, so Section 4 does not apply to everyone. But almost anyone who has been involved in the selection of hardware, software or services can fill out Section 1, which deals with the user's understanding of the contract terms before procurement.

What does your contract cover? Alan Taylor would like to know — see the questionnaire on Page 24.

Before you fill out the questionnaire, let's review the issues it covers. First, the area of user's knowledge should be considered. Does the user know what he's getting into?

It has been found that few people understand their insurance policies when they read them

(Continued on Page 24)

Reader Commentary

Operators Deserve More Attention, Credit

By David Plummer
Special to CW

In the industry, little attention is directed to the source of DP work, the computer operations area.

Too long has the misleading slogan prevailed that "anyone can operate a computer." This is no more true than saying anyone can be a programmer or do system analytical debugging. Computer operations staffs are highly trained, just like other professionals.

Your trainees, operators, senior operators and shift supervisors do the often thankless job of getting the work you need for both in-house and customer requirements. But they do more. They must contend with many different situations that occur too often in their day-to-day function.

Computer operators, to survive in our industry, must do more than operate computers. They must be able to respond not only to the needs of the people for whom they work, but also to the needs of their operating environment.

Schedules must be met. Hardware and software malfunctions and aborting jobs must be tackled. Proper personnel must be notified in crisis situations.

Operators are the first to acknowledge problem occurrences, and they must respond with logical solutions.

Most people in programming and management tend to overlook many facets of operating highly sophisticated computers. Operations personnel must be able to address hardware malfunctions to prevent unnecessary downtime, if possible. Yet they must have the knowledge and training to correctly perform the problem determination.

Software responsibility usually will not fall upon the operations staff, although it must be able to respond to the potential problem by indications from its operating system and take appropriate action.

Operations Training

An individual gets into the operations staff in a variety of

(Continued on Page 25)

Letters to the Editor

Another Answer

Alan Taylor's "Confusion on Withheld Tax Can be Solved" [CW, Jan. 15] pointed out a potential problem of withholding federal income tax by computerized payroll systems.

The difficulty arises because of the 1979 Internal Revenue Service [IRS] method of calculating the withholding amount by using "business days" instead of "calender days" in Table 8 (Daily or Miscellaneous Periods).

Taylor's solution of reducing the IRS Table 8 daily values by 2/7ths is not "the only way to stop further chaos." Our Information Science Payroll System simply employs IRS Table 7 (Annual Payroll Periods) to calculate an annualized amount. It then reduces the result to a payroll frequency amount.

This approach permits accurate withholding for any payroll frequency — whether weekly, biweekly, semimonthly, monthly or, for that matter, even trimonthly.

Robert F. Michaels
Assistant General Manager
Information Science, Inc.
San Antonio, Texas

Taylor Report 'Amusing'; Table 7 the Solution

I was amused by "Confusion on Withheld Tax Can Be Solved," the Jan. 15 Taylor Report. Alan Taylor led the reader to believe that 99% of all automated payroll systems will underwithhold federal income tax from an employee's pay check. That's only true if you are using Table 8.

As the product manager for Argonaut Information Systems, Inc., a software company that markets both a payroll system and a payroll tax calculation module, I would like to comment on the use of Table 8 (Daily or Miscellaneous Payroll Period) as a basis for calculating federal income tax withholding.

Taylor went to great length to explain how to overcome the problem in the daily table, discussing the "for seven, read five" solution, Julian calendar routines and a formula to recalculate the tax table.

Our payroll tax module uses a much simpler approach. First, it annualizes the employee's gross pay by multiplying the employee's wages times the number of pay periods per year (e.g., weekly = 52).

Secondly, the tax is calculated using Table 7, (Annual Payroll Period). And finally, the tax is divided by the number of periods for which the employee will be paid during the year.

This method requires that only two tables be coded and maintained (one for single taxpayers and one for married taxpayers), regardless of the number of different pay frequencies that a company has established. In addition, it will consistently calculate the same amount of withholding each month.

Use of the daily table for monthly employees, as Taylor described, will calculate different withholding amounts during the year because some months have more workdays than other months.

Paul Gustafson
Product Manager
Argonaut Information Systems, Inc.
Berkeley, Calif.

Not This One

Computer Systems Distributors, Inc. is one of only two microcomputer distributors in Syracuse, N.Y. Among many of the prestigious mirocomputer lines, we also carry Cromemco and have done so for over two years.

After reading "User Learns Cost Isn't Everything" [CW, Jan. 15] about Kenneth Sibrava's problems with a wholesaler of Cromemco equipment in Syracuse, I would like to set the record straight by emphatically stating that Computer Systems Distributors is not — I repeat, absolutely not — the wholesaler involved.

Joseph R. Luciano
President
Computer Systems
Distributors, Inc.
Syracuse, N.Y.

Resplicing Service

In reference to "Severe Paper Shortage Confronts Big DP Users" [CW, Jan. 15], I would like to advise that a service exists to get double the use from one-part computer paper. Computer Forms Recycling (CFR) provides a resplicing service or can sell a CFR 1000 splicing machine to DP users.

This machine has the capability to easily resplice once-used, one-part comptuer paper to provide a new box of continuous form for printing on the reverse side. Such paper could be used especially for compiles, dumps and test shots.

Any user interested in this capability can reach CFR International through P.O. Box 14545, Oklahoma City, Okla. 73113.

Jim Simon
Oklahoma City, Okla.

EDP professionals have a word for the new Wang VS computer.



Richard Berger, Vice President and Data Processing Manager, Bughaus, Inc., a Volkswagen service center network headquartered in Hartford, Conn.

"Because we had been using a computer—the Burroughs B1700—with card input sequential files and no video displays, we suffered long delays and storage constraints.

"Now, with our Wang VS system, storage is virtually unlimited, and we simply recall a screen load of information on the CRT to make a change in seconds—all of this without interrupting our normal flow of work.

"We've put everything in our business onto our VS system, including payroll, accounting, sales and wholesale and retail inventory control. And we did it in 90 days without changing languages and with only minor modifications in almost 90 COBOL programs."



"We are absolutely amazed at the throughput rate we've achieved with our Wang VS. On our very first job for one of the country's largest student insurance agencies, the VS arrived in Pittsburgh on December 23 and was completely installed and operational on-site on February 15, with 61 programs written, debugged and tested—all by only two people—and not a single line of code had been written until the machine came in the door.

"The VS really fulfills all of our requirements, particularly in areas where other systems are weak: cost/performance, language-availability, user-utility software.

"I think the real key for the DP manager is the utilities available with the VS, its speed and its interactive COBOL compiler. These three things combined make for a very powerful tool."

J.P. Scott, Data Processing Manager, Aptech Computer Systems, Inc., Pittsburgh, Pa.



Kenneth W. Cakebread, Manager of Data Processing, Trans-Air Forwarding and Brokerage, Inc., Inglewood, Calif.

"I had 30 days to convert about 220 programs from our old batch-oriented Honeywell 62 system to our new Wang VS system. Not only did I do it: Thanks to the programming power of the VS, I actually came up with more.

"Before we converted to the VS, the biggest problem we had in the accounts receivable area was misapplying cash. No more. Now, by capturing current information and keying it into the computer from a workstation, we're able to sort out potential problems long before they get to the accounts receivable stage. And with Wang's on-line editing capabilities, I'd say we've cut our average editing time on a per-item basis from 30 seconds to a single second.

"And believe it or not, while the VS gives us faster access and maybe triple the programming efficiency of our old system, it was only half the cost."

EDP professionals in more than 100 companies are singing the praises of the Wang VS. And for good reason.

The VS is a remarkably sophisticated, fully expandable virtual storage computer designed to provide maximum interaction in a mainframe environment.

The VS provides for distributed data processing, thus avoiding costly consumption of mainframe resources. It's fast, responsive, ease to use and can support up to 2.3 billion bytes of on-line storage. What's more the VS speaks EDP people's language: COBOL, BASIC, RPG II and ASSEMBLER.

We also think you'll appreciate how simple the VS is to operate. In fact, because of its level of sophistication, it can be operated by people with little or no computer-related training or experience.

One more thing: the entry level price of the VS is under $50,000. Which is perhaps the most remarkable thing of all about this computer.

For more information on the VS, return this coupon to Wang Laboratories, Lowell, MA 01851.

I'd like to know more about the Wang VS. Please send me a copy of your Executive Brochure.

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Letters to the Editor

Point Out Difference In Future, Please

"FTC Tightening Screws on DP Vocational Schools" [CW, Jan. 8] left us with a feeling of the "condemned without a trial." This feeling was caused for the most part by the headline, which in essence places all schools, state-supported or proprietary (private), under the same blanket of abuse cited by the Federal Trade Commission.

What about the schools that don't charge tuition? What about the schools that already have a policy of a pro rata refund as a published policy in their catalogs? What about the state-supported schools, such as ours, that offer 49 other courses outside the DP field?

Consider the quote from Bernard Ehrlich, an official of the National Association of Trade and Technical Schools: "The only funds an institution gets are from tuition." Not so with the state-supported vocational-technical institutes of Washington State.

The instructors in the DP Department at the L. H. Bates Vocational-Technical Institute suggest that in further articles the very definite differences between state-supported vocational schools and proprietary schools (private schools for profit) are pointed out.

Armand Yapachino
Supervisor
Trade and Industrial Education
L.H. Bates Vocational
Technical Institute
Tacoma, Wash.

An Application Note

In the article on the release of the Interactive Application System [IAS] Version 3, it was stated that the IAS user load of 32 interactive users "puts this system at the same level of multiuser terminal support provided by DEC's RSTS/E environment" [CW, Jan. 8].

Please note that RSTS/E supports 63 interactive user jobs on a PDP-11/70, controlling up to 127 terminals.

Simon Szeto
RSTS/E Program Manager
Digital Equipment Corp.
Merrimack, N.H.

Not Unique to OWL

The Jan. 8 issue of *Computerworld* contained an article in the Software & Services section entitled "TP Monitor Links Added to OWL."

The article listed five teleprocessing (TP) monitors currently supported, with a sixth pending, and stated that program development support under multiple TP monitors is "unique to OWL."

That statement is incorrect. The Librarian/Online from my organization currently runs under seven TP monitors, with support for several of them dating back to 1976.

R.M. Caughey
Product Manager
Applied Data Research, Inc.
Princeton, N.J.

Question of Validity

Not every 5-digit number is potentially a valid Zip Code [CW, Jan. 8].

For example, according to the 1978 *National Zip Code Directory*, 99999 and 340XX through 349XX are not valid Zip Codes.

However, I do agree a check digit could and should be used in a longer Zip Code.

Paul E. Black
Salt Lake City, Utah

'If That Isn't Enough'

Why all the fuss about a 9-digit Zip Code?

Let's look at what we have. In addition to a 5-digit numeric Zip Code, we have a 2-character alphabetic code for each state. Two alphabetic characters can be used to identify uniquely 676 areas. With the Zip Code, then, we can have over 67 million addresses.

If 67 million addresses aren't enough, the second character of the "state" field could be expanded with perhaps seven numerics (omitting the 0, 1 and 5, which look too much like letters). That gives 85 million unique addresses.

And if that isn't enough . . .

Sol Moldoff
Lakehurst, N.J.

Alas, Poor Cartoonist!

I see a common bug crept into the cartoon on Page 4 of the Jan. 15 issue.

Rather than "Alas! Poor Yorrick — I knew him well," what Shakespeare wrote was, "Alas, poor Yorick! I knew him, Horatio . . . (Hamlet, Act 5, Scene I).

Frank McKenzie
San Jose, Calif.

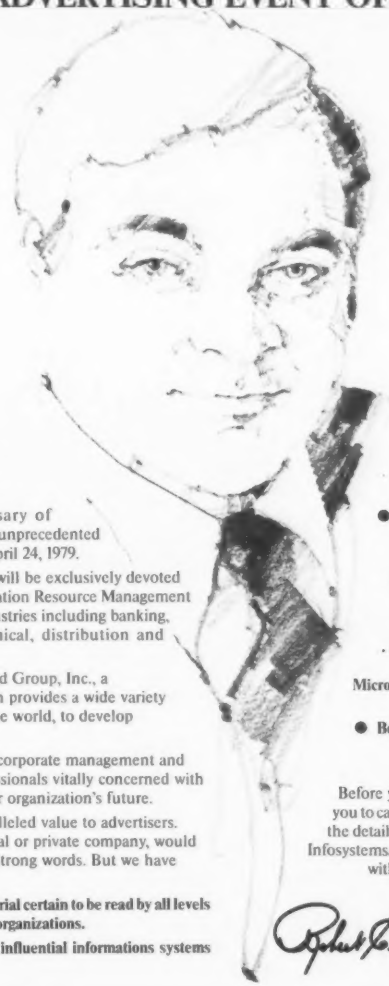
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From: Robert E. Dimond,
Vice President and Publisher
Infosystems

To observe the 20th Anniversary of INFOSYSTEMS, we will publish an unprecedented special issue of the magazine on April 24, 1979.

Unprecedented because this issue will be exclusively devoted to an executive overview of Information Resource Management (IRM) for a broad spectrum of industries including banking, manufacturing, insurance, chemical, distribution and government.

We have commissioned the Diebold Group, Inc., a management consulting firm which provides a wide variety of services to clients throughout the world, to develop the issue.

The issue will hit the desks of top corporate management and influential Infosystems/EDP professionals vitally concerned with the state-of-the-art as it affects their organization's future.

We believe this issue offers unparalleled value to advertisers. (Think of what you, as an individual or private company, would have to pay for this information). Strong words. But we have some strong reasons:

- **Powerful, thought provoking editorial certain to be read by all levels of management among recipient organizations.**
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- **More than 25,000 copies in bonus circulation to be distributed throughout 1979 to:**

. . . additional top management at the Fortune 1000 companies not already included among INFOSYSTEMS' substantial readership.

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- **Because this issue is one of a kind, it will be read and referred to for years to come.**

Pass along readership will be significant.

Before you finalize advertising plans for 1979, I urge you to call your INFOSYSTEMS' representative for all the details on what promises to be the most significant Infosystems/EDP advertising event of 1979. Participate with other industry leaders in INFOSYSTEMS' "Challenge of the 80's."

Robert E. Dimond

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How Much Coverage Does Your Contract Give?

Section 1: User Understanding of Contract Terms

- Are the terms explained in clear English? Yes___No___
- Are all terms in the contract specifically defined? Yes___No___
- Are the terms made clear to technical staff every time it considers getting equipment or software? Yes___No___
- Are the terms made clear to management each time it approves a procurement decision? Yes___No___
- What documents make up the contract?
  - The order. Yes___No___
  - The overall agreement. Yes___No___
  - Other (define). _____

Section 2: Substance of the Contract

Does the contract really guarantee the following provisions will be met:

- Special terms, equipment specifications? Yes___No___
- The user's right to upgrade in the open marketplace? Yes___No___
- The user's right to get maintenance and spare parts? Yes___No___

Section 3: User Remedies (In the Event of a Contract Violation)

Are the remedies stated in the contract:

- Readily available so the user can continue operations without losing his rights? Yes___No___
- Limited as to time, amount of damages or courts to be used? (Give details if known.) Yes___No___
- Useful (as opposed to "window dressing")? Yes___No___

Section 4: Practical Experience

If you know of a user who tried to get his contractual protection:

- What vendor was involved? _____
- Did the user succeed? Yes___No___
  If not, why not? _____
- Was it worth the effort? Yes___No___

Name _____ Position _____
Street Address _____
City/State/Zip _____
Vendor _____

Please return to Alan Taylor, **Computerworld**, 797 Washington St., Newton, Mass. 02160. Detailed answers are welcome.

Does Contract Protect You?

(Continued from Page 21)

and not too many people read them. The wording of computer contracts may also be confusing. Do we indeed consider the contract terms when we make our technical and procurement decisions?

Secondly, the substance of the contract is important. When a user orders computer supplies — whether hardware, software or a service — he usually intends to use it for some time and build on it in the future. He relies on it to fulfill his expectations.

Use involves maintenance. Now, all firms will *say* they will maintain the product or service. But how many firms will put a real maintenance clause — one that commits them to keep the equipment running — in the contract?

I know of one contract with a provision that defined maintenance as sending someone over every month or so to oil the hinges on the swinging gates in the processor.

Rights: Real or Illusory?

Reflect carefully before answering the questions in Section 2. Try to differentiate between terms that give the user *real* or illusory rights.

For instance, conventional terms may be defined in such a way as to render them meaningless. If you have any difficulty, send a copy of the contract along with your comments. The confidentiality of your firm is guaranteed.

The last two sections deal with theoretical and practical remedies available to the user.

Your answers and comments will be reviewed and reported on in this column so NCR doesn't feel like the only firm in the spotlight.

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Letters to The Editor

Praise for the Mumps?

In his letter lauding the Mumps language [CW, Dec. 25-Jan. 1], Charles Volkstorf missed a point about Mumps — its name. How can a DP director go to management and, with a straight face, advocate spending money on a product named "Mumps," much less expect management to credit cost-effectiveness to something that sounds like a disease disastrous to adults?

Besides, I have no idea from what source Volkstorf got his 80% growth rate figure for Mumps (sounds like Digital Equipment Corp. propaganda), but software that runs in a DEC or compatible environment is limited to the number of those environments.

For better or worse, the world of data processing is the world of IBM, so any software not transportable to IBM systems (as well as those of other manufacturers) is doomed to a minority following, regardless of its merits.

M. Gerard Jones
Albertville, Ala.

Impressed With Poppel

I was impressed with Harvey Poppel's remarks ["DDP: Step Toward Users' Economic Freedom," CW, Dec. 25-Jan. 1] on the office of the future. As an independent management consultant working with public agencies, I have been designing threshhold growth patterns and training staff for the information revolution.

Rather than looking at the limited concept of technology, we can expand our insights by looking directly at factors of production. The traditional industrial factors (land, labor and capital) can be rearranged under the influence of the new informational factor.

The labor factor has remained unchanged since the rise of consciousness, two million years ago. The agrarian revolution resulted from man's ability to manipulate *material* aspects of the world in production. In the second millennium A.D., we began to perceive of the concept of energy, and the conscious use of energy in production led to the industrial revolution. Only since 1947 or so have we begun to understand that information is a third physical component of the universe and consciously begun to apply it to production.

In this context, the "information revolution" is no less a trivial term than "industrial revolution," with concomitant social, political, economic and psychological changes.

The neoclassical (industrial) economics is becoming increasingly obsolete as the new factor of production (information) takes a greater and greater role in our economy.

This omnibus comprehension of production requires that we rewrite much of our three-factor theory.

Laurence Howard
Spring Valley, Calif.

"Top Secrets 1979"

New Insights into Information Privacy and Security, Taking the Profit Out of Computer Crime, Advances in Network Security, Better Approaches to Risk Analysis and EDP Auditing, and Breakthroughs in Data Base and Software Security.

These are some of the topics that will be uncovered in depth at the Fifth Annual Honeywell Computer Security and Privacy Symposium to be held April 2-3, 1979, at the Registry Resort, Scottsdale, Arizona.

If you are in any way responsible for, or have an interest in, computer privacy and security or the prevention of computer crime, you'll want to be there. Or be represented. Registration is $450.

Send in the coupon. Or call Jerome Lobel (602) 249-5370. He'll send you all the details.

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Hard-Working Operators Deserve Credit

(Continued from Page 21)

ways. He may be hired from an outside source or promoted from within. But once he gets there, the learning process really begins.

Much can be learned, and an abundance of resources can be used in teaching. Standard operating procedures, job requirements and processing and techniques which are unique to the system must be understood. Situations arise daily that require special handling.

Ongoing Training

Ongoing training procedures must be employed so the staff can grow in the state of the art in operations. Many different sources of instruction are available as training tools.

Courses are offered by colleges, vendors and schools. There are video instruction and teaching from manuals and workbooks. In-house training is a very useful tool in computer operations instruction.

The person responsible for training should be thoroughly familiar with the operating systems, the configuration and the techniques and procedures.

The hardware and software's interaction should be of key interest because the more aware your staff is of the internal workings of the system configuration, the more precisely it will handle your requirements.

In addition, the more awareness the operations staff has about the operating environment, the simpler your problem determination becomes, which should increase overall productivity.

Higher Salaries Deserved

Computer operations personnel have continually received lower pay than have programmers. Yet operations people are as skilled professionally as their programming counterparts.

I believe it is time the industry, as a whole, took a long, hard look at the salary level of operations staff. The pay an individual receives should reflect the investment the company is making in itself and its future.

With competitive pay, a decrease in operational staff turnover would occur almost overnight. Companies invest an abundance of time and money in training individuals to play a key role in their staffs only to find afterwards that the person leaves for a higher paying, but almost identical position.

It has been my experience that approximately 80% to 85% of turnover in operations personnel is solely because of pay-scale problems. In the long run, by making salaries competitive, companies would save money by the decrease in turnover and by not having to reinvest in looking for, finding, hiring and training replacements.

Operators Are Professionals

Computer operators are replaceable, as are all individuals, but the loss of valuable employees in key roles hurts any company.

Operators enjoy their work. But it is hard to feel comfortable in a job when you can make more by leaving it than by staying.

Many operators feel they are victims of discrimination. They very seldom are asked their opinions on matters involving the use of operations. But they feel their judgment is as good as the person who makes the decisions that affect them — sometimes better — since they must contend from day-to-day with the operating environment.

This is particularly true of shifts that work outside of the normal working day.

Computer operations staffs are professional in every sense of the word. But, like other professionals, they need the chance to achieve, better pay, more responsibility and worthwhile goals for which to strive.

Companies should also look to operations people for promotional opportunities. Most computer operators will remain just operators, or leave the industry altogether, not because they want to do so, but because they are more or less forced to do so.

Many other professions offer more lucrative pay, better advancement opportunities and, most of all, a challenge.

It would be indeed a waste to lose the talent and reliability your operators possess.

Plummer is an operations manager with Management Applied Programming, Inc. in Los Angeles.

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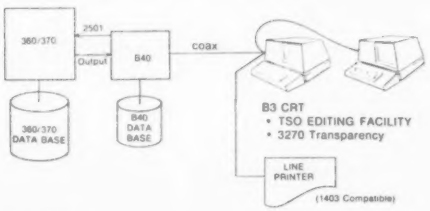
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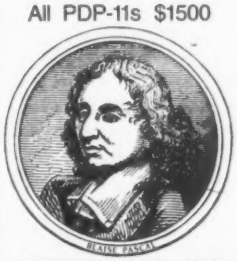
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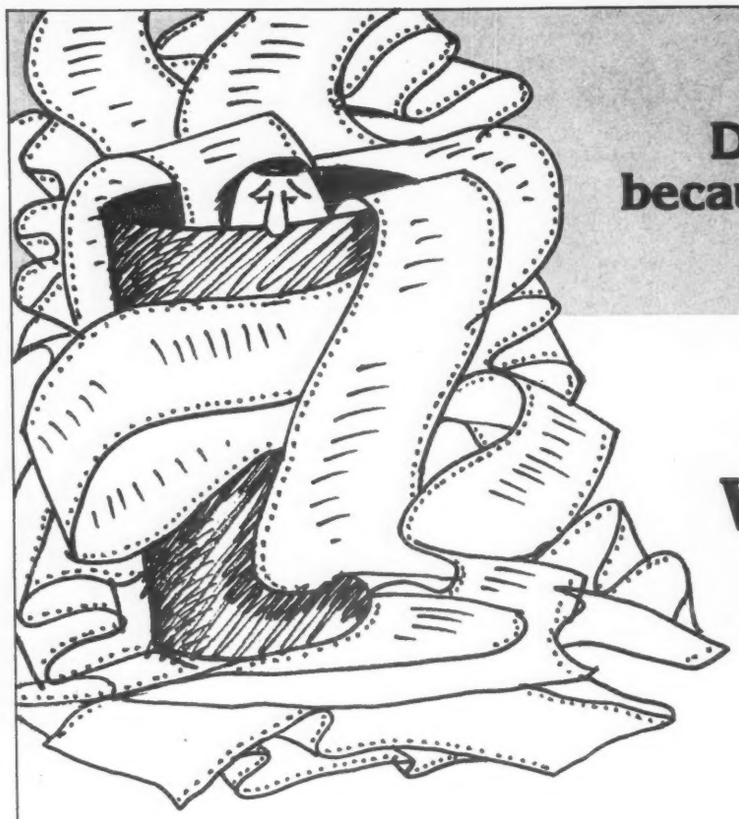
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System Up in Six Weeks

Good Team, Good Management Pay Off

By Don Leavitt
CW Staff

DEERFIELD, Ill. — "My systems people did one hell of a job . . . They were a tremendously dedicated group, but it worked because management gave me a free hand."

That's the way Dick Kern, manager of payroll and benefit accounting at Fiat-Allis, summarized the factors that enabled his organization to get a packaged payroll system up and running correctly six weeks after it came in the door.

There is more to the story than that, of course, and Kern spoke warmly of the support he had gotten from his software vendor. But the shirt-sleeved manager was especially appreciative of the way his management left him alone while the implementation was underway: "My boss would ask how things were going and, as long as I could tell him 'fine,' he didn't bother us."

Fiat-Allis is a joint venture of the Fiat automobile firm in Italy and the Allis-Chalmers Corp. here in the U.S. Started in 1974, much of its payroll, retirement and personnel work was handled by Allis-Chalmers through 1976. In 1977, however, Fiat-Allis management decided to go its own way on various operations, including the processing of payroll, personnel and pension records.

In late spring, Kern was tapped to implement that decision and to have at least the payroll portion of the project operational by Jan. 1, 1978. Although he has "been exposed" to DP people for "about 25 years," Kern is not a technician.

To get things moving, he worked with one other Fiat-Allis employee to plan what was needed. And to get things implemented, he "begged, borrowed and stole" people from a number of places, including Fiat-Allis, Allis-Chalmers and an outside consulting firm.



Dick Kern

Having talked to several software vendors and some of their clients, he contracted in late August for the Super payroll/personnel/pension package from Wang Laboratories, Inc. Many other packages seemed to have similar capabilities and any one might have done the job, but Kern was impressed with the endorsements of Wang users, who seemed to feel Wang support was better than what was available elsewhere.

The software was delivered Oct. 15, 1977, and the first paychecks were produced on schedule, in time for the first pay period of 1978. The transition went so smoothly "I guess 95% of the people affected didn't even know there'd been a change," Kern said.

Currently, the payroll portion of the package is handling 1,850 salaried employees in 46 states and various foreign locations. The

(Continued on Page 29)

'Maxximum' DBMS for SEL 32

SANTA ANA, Calif. — Available now for use on the Systems Engineering Laboratories, Inc. (SEL) 32 series of minicomputers, the Maxximum data base management system (DBMS) from California Software Products, Inc. (CSPI) is currently being implemented in other environments.

The key to the system's expected portability is the fact that it was written completely in CSPI's version of Pascal, a high-level language that is used on a variety of CPUs, a spokesman explained.

Maxximum functions in both real-time and conventional batch DBMS environments, he said, adding he believes the system is the only one commercially available that is capable of functioning in a real-time setting.

The package consists of four standard and four optional modules. The standard building blocks are a Data Definition Language processor, a host language interface, the DBMS itself and a data base administrator utility. The options include a "casual user inquiry" language, a built-in language interface, a Fortran precompiler and a report writer.

The host language interface enables the user to utilize the data base from programs written in languages such as Fortran, Cobol, assembler "or even RPG," according to CSPI. The only requirement is that the host language support subroutine or procedure CALLs.

The Maxximum DBMS, although implemented hierarchically, also supports networks and relations. The hierarchical implementation does away with the "traditional" schemes of pointers and their attendant costs in terms of time and storage, the spokesman asserted.

The data base administrator utility is an interactive interface that accepts English-like commands to provide backup and recovery from hardware failures and unintentional updates. It also controls access to the data base, he said.

The current Maxximum operates under RTM 6.0 on any SEL 32 with 96K words of memory, disk, tapes and printer. License fees range from $14,000 to $53,000 depending on the modules selected, the company said from Suite 300, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701.

DEC Offers Free Software Kit

MAYNARD, Mass. — Apparently acknowledging that it cannot provide all the application software its users might need, Digital Equipment Corp. has put together a free series of booklets and forms to help both users looking for software and suppliers seeking users.

"A.S.K. Digital" is an Applications Software Kit designed by DEC's Manufacturing, Distribution and Control Products Group. Included is an "Applications Referral Catalog" containing product descriptions submitted by independent software vendors.

While the write-ups are prepared by the suppliers, they are not identified except by a code. In order to get in touch with the supplier, a potential user has to contact DEC, but a spokesman made it clear this is only a monitoring mechanism and not a means of charging either user or supplier.

DEC wants to encourage the flow of software, he said. Although the supplier may and probably will charge a fee for the use of his software, DEC gets no payment for listing a product in the catalog. Nor is the supplier charged a fee for submitting the product for listing, the spokesman emphasized.

Other parts of the "A.S.K. Digital" collection are a booklet with guidelines for purchasing software, request forms for obtaining vendor information and a form for vendors to describe new software products for future editions of the catalog.

The spokesman said it is too early to say how often the catalog will be updated. That will depend, he said, on how many new products are submitted for listing and the results of monitoring inquiries about products that will go, initially, through DEC.

Copies of the Applications Software Kit may be obtained through DEC's sales representatives or by writing to DEC, ML5-2/M46, 146 Main St., Maynard, Mass. 01754 (Attention: A.S.K. Central Desk).

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Internal Consultants Can End Small Firm Woes

By David L. McKown
Special to CW

Much of the unnecessary expense and many of the problems associated with defining and implementing new systems can be avoided by using the services of an internal consultant.

Most small and medium-size firms cannot afford the luxury of a full staff of DP experts to guide them in the selection of systems. Consequently, such firms frequently rely on the advice of the system salesman or an outside consultant hired for that purpose.

Unfortunately, the resulting system frequently does not fit the organization's needs. This is not to say that the hardware and software do not do the tasks for which they were designed. On the contrary, they do exactly what they were designed to do.

The problem is that too often the design is inappropriate or inadequate for the purposes of the company that now has to use it. That unhappy situation results when the system's designers are not familiar enough with the operational, political and intangible realities of their client company.

While the system's components may seem to operate together just fine according to the designer, they may fail miserably when placed in the company's day-to-day operating environment.

Whether the designer is a member of the software or hardware vendor's customer service and sales staff or an outside consultant, his fundamental lack of understanding of the customer's needs can become painfully apparent once the system is installed and operating.

How, then, can a company that is really too small to afford a full DP staff be assured that its best interests are foremost in the design of a system?

A Possible Solution

For more and more companies, the answer is to maintain a small staff of dedicated and highly motivated generalists frequently known as internal consultants.

It is this group's responsibility to maintain a high level of awareness of the internal operations of the various business functions within their company. Its primary responsibility is to ensure that those systems reflect the organization's changing needs.

The internal consultant may be responsible for preparing logic flowcharts that show various business processes. Using the flowcharts to define the company's actual situation, he can specify the characteristics that a system must have in order to provide a solution for problems — rather than create other problems — within that environment.

That specification can then be used to evaluate any proposed system with the consequences of its actual use in mind.

Not Systems Analyst

The internal consultant should not be confused with the systems analyst. While much of his work involves analyzing existing systems, the internal consultant is also responsible for defining new systems and procedures. That is not usually the function of the systems analyst.

Further, the systems analyst tends toward computer-oriented solutions to problems even in those cases where such an approach is not necessarily the most appropriate.

The internal consultant, on the other hand, is free to look at many alternate solutions, from a simple change in paper flow to a departmental reorganization. Of course, if a computer solution appears to be the best, any decision to implement it will be made with the participation of the people who will be affected by it and will have upper management's support.

All too frequently, a computer solution is proposed by a systems analysis group member or by an outside consultant who has reached that conclusion within an organizational vacuum. When put into effect, such a move does not solve the original problem. Instead, it creates more problems because it is not accepted by the user organization, which feels no "ownership" of or responsibility for the new system. Such a situation virtually guarantees failure.

His detailed knowledge of the operation's components will give the internal consultant a well-developed sense of the company's overall operation.

It is that overview capability that makes the internal consultant valuable to the company in many ways, not just in defining system requirements, but in defining and modifying the basic methods by which the company operates in all phases of its work.

Necessary Qualities

As for personal qualities, the internal consultant should first be an accomplished generalist and an excellent communicator. Since the job cuts across organizational boundaries, he must be able to probe, elicit information and ideas and make suggestions for improvements without being perceived as a threat to any component or to any individual within the organization.

In order to convey this impression, the internal consultant must have an established reputation as an exceptionally capable individual and must be skilled in interpersonal relationships. All activities must be pursued openly if he is not to acquire the reputation of "hatchet man."

A senior employee usually makes the best internal consultant, because years of experience in the company permit a quick cutting-through of the extraneous material surrounding — and sometimes burying — any organizational procedure. Personal contacts made through the years can be very valuable in establishing trust and confidence.

Management's Responsibility

Management should let the rest of the organization know that the internal consultant has a definite task that will benefit the entire operation.

The internal consultant should be available to organizational subgroups upon request to assist them in defining and solving their internal business procedures and DP problems. It must be made clear, however, that his recommendations will not be put into effect until the affected subgroups are consulted.

In short, management should emphasize that the internal consultant is a tool to help the organization operate more efficiently for the benefit of all its members.

In order to attract and retain competent internal consultants, the company should strive to create an attitude of respect for the position. Those chosen should be senior employees with good reputations within the organization.

McKown has been functioning as an internal consultant at Westinghouse Electric Corp., where he is officially a senior engineer.



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Word Processing Package Built for DG Mini Users

ATLANTA — Developed for use with Business Basic on Data General Corp. minicomputers, a word processing package from Technical Analysis Corp. (TAC) enables users to work concurrently in the twin disciplines of word processing and data processing, according to a spokesman.

The package, called Word Power, supports the preparation and printing of documents through a conversational-style dialog and menu selection. Use of standard office terminology throughout Word Power makes even complex documents easy to produce, the spokesman claimed.

Most functions are performed with a single keystroke on a DG 6053 CRT terminal attached to a Nova, Micronova or Eclipse mini. "Unlimited" text can be entered and additions, modifications and deletions can all be controlled in this way, he said.

The package also has convenient features for final copy preparation, the spokesman continued. Headings are centered, phrases underlined, margins adjusted, text justified, columns aligned and pages numbered by the system.

Because of the variety of peripherals that can be attached to DG equipment, TAC suggests a high-speed line printer as the appropriate outlet for draft copies and "letter-quality" character printers for final documents.

The one-time end-user license fee for Word Power software begins at $1,950 for the single-station version. Shipments — on magnetic tape — are expected to begin next month, the company said from 120 W. Wieuca Road, Atlanta, Ga. 30342.

Payroll System Up in Six Weeks

(Continued from Page 27)

foreign personnel are paid in U.S. funds, so that was no problem; Wang maintenance of the tax tables for U.S. jurisdictions has been "great," so Kern has no worry there, either.

Implementation of the pension processing subsystem was ongoing through 1978. The first phase of the work, preparation of checks for retired persons, was completed on time earlier this month.

The personnel subsystem is under way, but Kern noted he had encountered some "hiccups" in the interface between payroll and personnel. He said the linkage should be "like pouring water through a funnel," but it didn't turn out to be that easy.

He also had some problems in the pension subsystem, he recalled, saying he has "a feeling" the pension portion of the three-part package "isn't completely implemented or tested by Wang itself yet."

It's not that the grey-haired Kern wants a miracle. "A package can't do everything for everybody. Some people want it to slice their bread but, as far as I can see, a package is something you build on."

He is beginning to build the history files mandated by the Employee Retirement Income Security Act, but the requirements are so strange "I can see why so many people call it 'Every Ridiculous Idea Since Adam.' "

Although the personnel subsystem would allow Kern to create a skills inventory, he wondered if that is appropriate for salaried employees whose skills are hard to codify. The applicant flow reporting will be implemented only if the personnel department gives it a go-ahead.

Allis-Chalmers has a heavily modified version of the payroll package that has evolved into Wang's Super system. It has been so altered by Allis-Chalmers that it is unrecognizable, according to Kern, who admitted it works "but we've got a whale of a better program at Fiat-Allis than Allis-Chalmers ever had."

Scientific Library Updated

HOUSTON — Edition 7 of the International Mathematical and Statistical Library of Fortran subroutines for mainframes and minicomputers has been enhanced by "several major changes," according to a spokesman for International Mathematical and Statistical Libraries, Inc. (IMSL).

The minicomputer libraries, previously just subsets of the total library, have been expanded to make them comparable to the routines for mainframe users, he noted.

The overall library has been expanded through the inclusion of 38 basic linear algebra codes as well as several routines to make the library easier to use. These include HELP commands that display or print out information about the library and support for the user's choice of I/O devices, the spokesman explained.

Documentation has been substantially improved, he continued, citing tabbed dividers as illustrations of the new level of support. Finally, subroutine names and argument lists have been further standardized.

The complete library includes 458 Fortran subroutines and is available to mainframe users for $1,400/year. Minicomputer users can have the routines for $1,200/year. University sites are entitled to a 25% discount, the spokesman added from the Sixth Floor of the GNB Building, 7500 Bellaire Blvd., Houston, Texas 77036.

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Several Call Move 'Painless'

Packages Ease Banks' Switch to In-House Gear

CUPERTINO, Calif. — While computers have been an essential part of the banking scene for some years now, many small and mid-sized banks have had to depend on correspondent banks for DP services. Developing efficient software in-house has been prohibitively expensive, and the result has often been less timely information and little — if any — customized service.

Today, however, many of these same banks are switching to on-line, in-house systems. And several report that the move, which has led to improved services, has been painless, fast and economical. As often as not, they give the credit to packages such as those offered by software houses and, in some cases, by remote computing vendors.

The Integrated Banking System (IBS), for example, consists of 13 application subsystems and is currently used in more than 50 data centers nationwide, serving more than 600 banks. Originally developed by the National Bank of Commerce in Lincoln, Neb., and now marketed exclusively outside Nebraska by Tymshare, Inc., IBS runs on Burroughs Corp. systems from the B1700 and B1800 up to the B4800.

The complete system includes item processing, savings, commercial loan, general ledger, account reconciliation, dealer floor plan, funds transfer, trust accounting, on-line inquiry and central information file (CIF) support. Tymshare also backs its customers with specialists to bring the system up and to keep it in working order.

Distance Caused Problems

One IBS user is Guarantee Bank in Atlantic City, N.J. Bill Mengel, the DP officer, recently talked about the change. "We formerly had a correspondent bank in Philadelphia process our work, but the distance caused problems. Sometimes we had delays of two, three or four days, which affected our record for customer service."

The first IBS package installed at Guarantee was the personal loan system, which included simple interest calculations. This made the bank one of the first in the state to offer customers that kind of computation.

But the 13-branch operation is faced with a special growth situation as Atlantic City gears up for legalized gambling. "While our decision to bring DP in-house was made prior to legalization, that decision looks even better now," Mengel said.

"Our Burroughs B2700 with the Tymshare software is going to make things easier by allowing us to do things we never would have done with a service bureau," he added. The bank now has eight IBS subsystems in place. These include mortgage loans, demand deposit accounting and a certificate of deposit system as well as the original personal loan application.

Maintenance Ease

It's hard to put a value on the switch, but Mengel said he gets better information sooner. "We are much happier with the system's operation," he noted. Input to the loan system is through payment coupons coded with magnetic ink characters and output is largely microfiche, although some hard-copy records are produced.

Beyond that, the programs are written in Cobol and are modular and easy to handle. "They are structured. I can go in and find exactly what I'm looking for if I want to make a change," Mengel said.

But many changes can be made without even getting into the program code. Control cards, for example, enable the IBS user to tailor the system to his specific needs. One parameter entry controls pocket selection on a reader/sorter, while others set the service charges on checking accounts or the interest rate on savings accounts.

Tailored Software

While Mengel looked to ease of maintenance, Dave Houchins, executive vice-president of Chemical Bank & Trust Co. of Charleston, W. Va., pointed to another problem that packages solved for him. It would be virtually impossible, he said, for a small bank to perform systems analysis and program multiple on-line applications quickly.

"You'd need about 10 top-grade programmers and that's very costly," he continued. "It makes a lot more sense to buy a system that's already been debugged, even if it's not exactly the way you'd like it. The changes needed to tailor it are usually not difficult to make.

"Having our own system and tailored software means being in charge of our own destiny," Houchins declared. He noted that as a bank grows and its customer base expands, "it becomes less and less economical to use a correspondent bank arrangement and more and more practical to invest in your own data center."

Tailored Operations

Making much the same point, Dan Ritchie, assistant vice-president of the Nevada State Bank in Las Vegas, said, "When you get your own computer and software, you're acquiring real property and you get the financial benefits of that move. You are also able to keep bank information under better control."

But he shied away from customization. "We tailored our operations to suit the packages, instead of the other way around. We didn't have a programming staff at all and in many cases, the differences [between what we have and what we think we want] are merely a matter of wording."

Ritchie's four-branch commercial bank converted smoothly to its on-line system. In most cases, the overlap period in which both the old and the new system were operating was short, ranging from two weeks to a month and a half.

The systems are both efficient and effective. That's largely a matter of where they came from, according to Guarantee's Mengel, who noted the Tymshare systems "were developed by banks for use by banks.

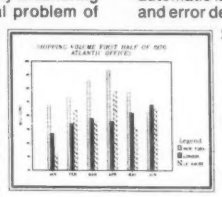
The IBS software was written for Burroughs systems and that, he said, is a distinct advantage over packages written for other mainframes, since they must be translated to work well with the equipment he has.

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Datapoint Emulator Offered

GLADWYNE, Pa. — Version 3 of the Keypunch/Key Verifier Emulation package for Datapoint Corp. dispersed DP systems includes more flexibility and features to ease the operator's work than were in previous releases of the software, according to the vendor, The Newbery Group, Inc.

Written in Datapoint's Databus and capable of operating on all current DOS-based systems, the package frees the operator from "drum card" limitations. It also allows the operator to visually check current work and to review previous records in order to avoid missed or duplicate records, a spokesman said.

The system keeps a "card" count and batch number to help the operator keep track of where he is, and it also keeps operator statistics to help management monitor how well the keying operation is progressing, he added.

The control card on a conventional keypunch machine is replaced by programmed format and data editing routines.

Newbery's package reportedly can be used at the low end of Datapoint's line on a single-user 1500 dispersed processor with dual diskettes, but it is upward-compatible to all multiuser systems, including the Attached Resource Computer (ARC).

The emulator is available in object code for $1,000. Source code is also available, Newbery noted from 1132 Stony Lane, Gladwyne, Pa. 19035.

'Basic-Doc' for DG Sites Eases Program Development

COSTA MESA, Calif. — Basic-Doc, now available from Applied Business Systems, Inc., is a development and documentation aid that gives programmers writing in Data General Corp.'s Extended Basic program development simplicity as well as readability of Cobol, according to a spokesman.

In effect, it allows programmers to utilize the good features of Basic — especially the interactive development support — and to create programs that are as readable as Cobol, he said.

In operation, the programmer has to set up a "System English Dictionary" in which any symbol — whether variable or line number — is assigned a 10-character "English" name and, if greater readability is desired, an additional 32-character "English" description.

Once the dictionary is established, the programmer can code using the symbols, but Basic-Doc will substitute either the stored name or the description at the programmer's discretion. However, the original symbol is shown in brackets for ease in modification.

During program development the reverse technique can also be used, allowing the programmer working on a subroutine to identify the object of a GOTO or GOSUB by a symbolic name, after which the software inserts in the Basic code the actual address of the line number being referenced.

Thus, although the listings may be Cobol-like, the working code is in normal Extended Basic ready for execution on any 64K-byte DG Nova or Eclipse supporting the language under mapped or unmapped RDOS.

User license fee for Basic-Doc is $1,250 with support available for $125/year, the spokesman noted from Suite B6, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

Software for PDP-11 Retrieves Credit Data

FAIRLEE, Vt. — An on-line credit information retrieval system written in Mumps for use on Digital Equipment Corp. PDP-11s has been developed by and is now available from Country Programmers, Inc.

Accessible from either local or remote terminals linked to the DEC minis, the system offers the small, independently operated credit bureau a way to provide automated credit reporting services, the vendor said.

The PDP-11 was selected for the system, the spokesman said, because DEC's time-sharing software can support 40 concurrent users accessing one data base. The appropriate PDP-11 is determined, however, by the amount of file storage and related communications equipment needed by a given installation.

The retrieval system package costs $15,000 from the vendor on Main Street, Fairlee, Vt. 05045.

IMS Gets Link To Update Package

ATLANTA — The On-Line Alpha System software, which supports the update and retrieval of records from large alphabetically oriented files, has been interfaced with IBM's IMS data base management system to create a system more powerful than either by itself, according to the Alpha System vendor, Insurance Systems of America, Inc. (ISA).

The software is application-independent. It is useful in insurance environments, a spokesman said, but there is nothing in the logic that limits it to that industry.

The system is used wherever there is a need for a high-speed search of name files and only minimal information, such as a last name, is known.

When the system locates the correct record, the response to the terminal operator can either identify the "key" for locating more specific information or provide the complete information desired. For ambiguous cases, when more than one record meets the search criteria, the response helps the user pinpoint the correct record, the spokesman said.

The On-Line Alpha System can be purchased for $44,000, but lease plans are also available. ISA can be reached through P.O. 47975, Atlanta, Ga. 30362.

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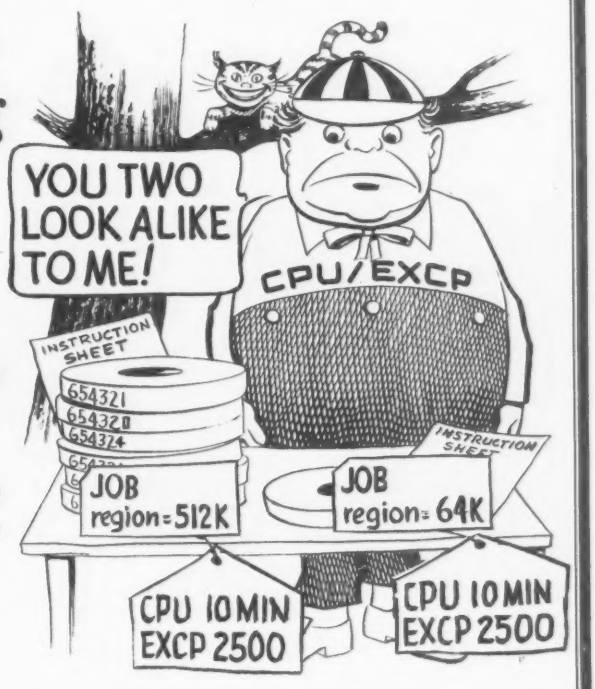
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Stand-Alone Check-In Aid Aimed at Airline Industry

By James W. Warren
Special to CW

New applications are being identified faster than appropriate software can be written, so there is an increasing need — and market — for good user-oriented systems.

But only a package that truly fits its application will gain and hold market recognition as a "better mousetrap." Such is the case with Raytheon Data System's stand-alone departure-control/check-in system called Raycheck.

Introduced to the airline industry in early 1978, it is a large integrated hardware/software system, costing $100,000 or more depending on configuration. Its market acceptance points up one of the key criteria of application-package success — it can give substantial dollar savings to its users, savings that more than pay for the system.

But meeting those criteria depends on the vendor's understanding of the application and the vendor's ability to build or assemble components — hardware, software or both — that will suit current and future application needs. Raytheon felt it fulfilled those requirements with Raycheck.

With air traffic increasing — particularly with lowered fares — processing of passenger check-in and overall flight-control data is extremely complex and demanding. Large airlines typically use large multiprocessor systems to handle this passenger and flight information.

For every commercial flight, airport personnel access the airlines' systems to get correct, up-to-date information on reservations and flight-aircraft specifications, and they add to that the specific check-in and cargo data that develops as the flight nears takeoff.

Smaller airlines that don't have their own computers must tie into the larger lines' networks both for reservation and flight/cargo information. Control of check-in activity is time-critical but the cost of data communications between geographically dispersed airports and the CPUs they use can be high, so we saw a clear need for a stand-alone check-in system.

Such a system would serve as a "pseudo-mainframe" at the airport, keeping relevant flight and passenger data locally and tying into a large-airline system to get reservation data for each day's flights. That kind of facility could save substantial communications costs and avoid hang-ups caused by equipment failure anywhere outside of the immediate vicinity.

Beyond handling the logical needs of the application, any system has to satisfy specific but rather tangential requirements. In Raycheck, for example, many modules were written to make the operator interface more easily and to provide high system availability.

For an airport operator, all processing should be as simple as answering formatted questions that appear on the display screen. Beyond that, the system has to work in the normal airport environment without special facilities and all systems have to be able to use back-up processors if the primary unit fails.

Raytheon's long-term airline support satisfied the final requirement for a successful package — backing by an experienced vendor with a proven record of responsibility.

Other Advantages

Our airline experience provided other advantages in developing this package. Many of our other airline terminal systems "speak" either the special airline reservation Pars/Ipars or U-100 protocols. Raycheck was designed to appear like a simple intelligent terminal to a host CPU in either of those systems.

To show that we do know what we're dong with large, redundant systems, we can note we've been configuring multiprocessor systems for years, both for airlines and seismic applications.

In terms of the applicable processing logic, we knew the specific details that would go into the basic program modules — passenger check-in, aircraft weight-and-balance and supervisory functions, plus the communications interface to Pars/Ipars or U-100 networks.

We also knew that system hardware and peripherals would have to support many users. Some Raycheck systems control operations for several smaller, "down-line" airports as well as their base locations. A large configuration might include dual-minicomputers with interprocessor connections, multiple disks and as many as 50 CRTs, 24 boarding-pass printers and five or more administrative message printers.

It's because we know how much background went into the design and development of Raycheck and how well the result has been accepted by our target market that we argue that people who know an application area are best equipped to become creditable and successful vendors of packages to serve that area.

Warren is general manager of Raytheon International Data Systems.

Qpac Introduces Report Writer

MANCHESTER, N.H. — A user-oriented report writer has been introduced by Qpac of America, Inc. as an enhancement to its Qpac payroll, personnel and labor costing system or as a stand-alone utility.

The Qtab report writer lets users with little or no DP experience generate documents with any desired format or data precedence. The utility can work with multiple files, merging and resequencing as required.

Although Qtab is useful for Equal Employment Opportunity (EEO), Employee Retirement Income Security Act (Erisa) and other reports related to government contract compliance and wage/price guidelines, there is nothing in the package's logic to limit its use to the payroll/personnel application area, a spokesman stressed.

Both Qpac and Qtab are written in Cobol, with some assembler routines, although those are being eliminated, for use on IBM 360s and 370s.

Qtab is a free enhancement for users of Qpac. For others, it can be purchased for $6,000 or leased for $1,200/year, the vendor said from 1 Perimeter Road, Grenier Field, Manchester, N.H. 03103.

'Quick-Tube' Improves TSO Response

LOS ANGELES — A communications software package that makes Time Sharing Option (TSO) systems running under Tcam operate with faster terminal response time has been introduced by Evergreen Consulting, Inc. Called Quick-Tube, the software shifts TSO polling operations from the mainframe to the IBM 370X front end to eliminate poll delays, the company said.

When using TSO with Tcam for MVT, SVS and MVS operating systems, IBM recommends the introduction of a polling delay to overcome CPU overhead. But this cuts terminal response time for IBM 3270 CRTs, which is an important user consideration, a spokesman said.

The Quick-Tube package moves the polling operations from the host to the IBM 370X or equivalent front end, which takes this overhead function out of the CPU and improves CRT response time for TSO users, the spokesman stated.

Overhead Problem

Without the Quick-Tube software, users would have to upgrade from Tcam to Vtam to solve the CPU overhead problem, he noted. Vtam could require 200K to 400K bytes of additional storage in the CPU, which would necessitate the installation of a Network Control Program in the 370X. This could add 128K bytes in the front end depending on the configuration, he explained.

Instead, Quick-Tube uses standard Tcam commands to install the autopoll channel program logic in the 370X. Users can specify continuous polling operations without delay from the front end.

In a typical installation of Quick-Tube — a system with a 370/158 attached processor configuration, one 3705 and 70 TSO users — the response time with the IBM poll delay was 2.2 sec, while with Quick-Tube it was 1.5 sec, Evergreen noted.

The package costs $7,200/year or $650/mo with maintenance on the user's first CPU. Additional systems cost $500/mo or $5,500/year. The software can be installed in one hour, Evergreen said from 2608 Ivanhoe Drive, Los Angeles, Calif. 99039.

According to Datapro Survey

DEC Tops Ratings for Remote Terminals

By Ronald A. Frank
CW Staff

DELRAN, N.J. — Datapro Research Corp. has taken its annual survey of remote batch/remote job entry terminals and built a list of user preferences based on 311 responses.

Since the list of equipment included in this terminal category was selected by users, it appears that a variety of terminals and CPUs were rated side by side.

As an example, Digital Equipment Corp. PDP-11/34 and 11/40 processors were rated alongside more limited IBM 3770 series terminals, and IBM 360/20 workstations were listed with Data 100 Corp. units.

While it may not be significant in the final ratings, the list of equipment covers a broad range of capabilities, all of which have been tied together. In some cases, the capabilities are not comparable. The PDP-11 processors, for example, have programmable protocol parameters; this item is usually limited to several less flexible terminals.

More Ebcdic Than Ascii

As might be expected, 70% of the user responses specified batch work as the major application, but 21% mentioned data entry and 18% said they used their equipment for "stand-alone processing."

Almost three-quarters of the respondents used Ebcdic code while 16% specified Ascii. About 31% of the data was being transmitted at 4,800 bit/sec, 26% of the respondents transmitted data at 2,400 bit/sec and 25% used the 9,600 bit/sec transmission speed.

The survey showed that many users operated with more than one speed, using a primary speed on private lines and dropping to slower transmissions on dial backup.

Most of the users employ private lines (59%), although a significant portion (43%) said they operated on dial-up facilities. Most of the terminals — 85% — operated on point-to-point links; only 6% operated on multipoint facilities.

Binary synchronous protocol was specified by 81% of the respondents, with only 5% specifying IBM's Synchronous Data Link Control (SDLC).

Users were asked to list their host CPUs and, as might be expected, IBM mainframes were found operating in a majority of the nets. About 34% of the users had IBM 370 CPUs in the Model 145 or smaller class, while 40% said they had Model 155 and larger machines. IBM 360 mainframes were mentioned by more than 7% of the users.

The only other mainframe vendor with more than 5% was Control Data Corp., whose 6000/7600 Cyber 70 series was used by 6% of the respondents.

In performance ratings, users ranked the equipment of Digital Equipment Corp. highest, followed by Burroughs, Corp., Data 100, Sycor, Inc., Four-Phase Systems, Inc., and IBM. Other vendors included Harris Corp., CDC, Datapoint Corp., Unitech, Inc. and Mohawk Data Sciences Corp.

The survey results are included in a report called "All About Batch/RJE Terminals," which also lists specifications on 138 terminals from 41 vendors. The report is available for $12 from Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

Burroughs DDP Software Backs B860, B870 Processors

DETROIT — Burroughs Corp. has introduced distributed data processing (DDP) software for its B860 and B870 communications processors. The Computer Management Distributed Information Software (CMDIS) system provides program-to-program communications between mainframe systems, offers expanded capacity for distributed on-line data entry operations and features interfaces to central CPUs, packet-switching services and network architectures, Burroughs said.

The B860 and B870 are compact, use the Master Control Program (MCP) and have multilanguage and multiprogramming capabilities. They are configured for communications processing including terminal network management, distributed site data entry and collection, and electronic funds transfer.

The processors enable users to set up networks for transferring data to remote sites, the firm said.

The CMDIS system is structured around a basic set of program products designed for data communications operations and control. It includes a system communication module, the On-Line Data Entry System (Odesy) for use with CRT terminals, a command-and-edit (Cande) module for on-line program and data file creation and the Transaction Distribution System (TDS).

These elements are augmented by inter-

(Continued on Page 38)

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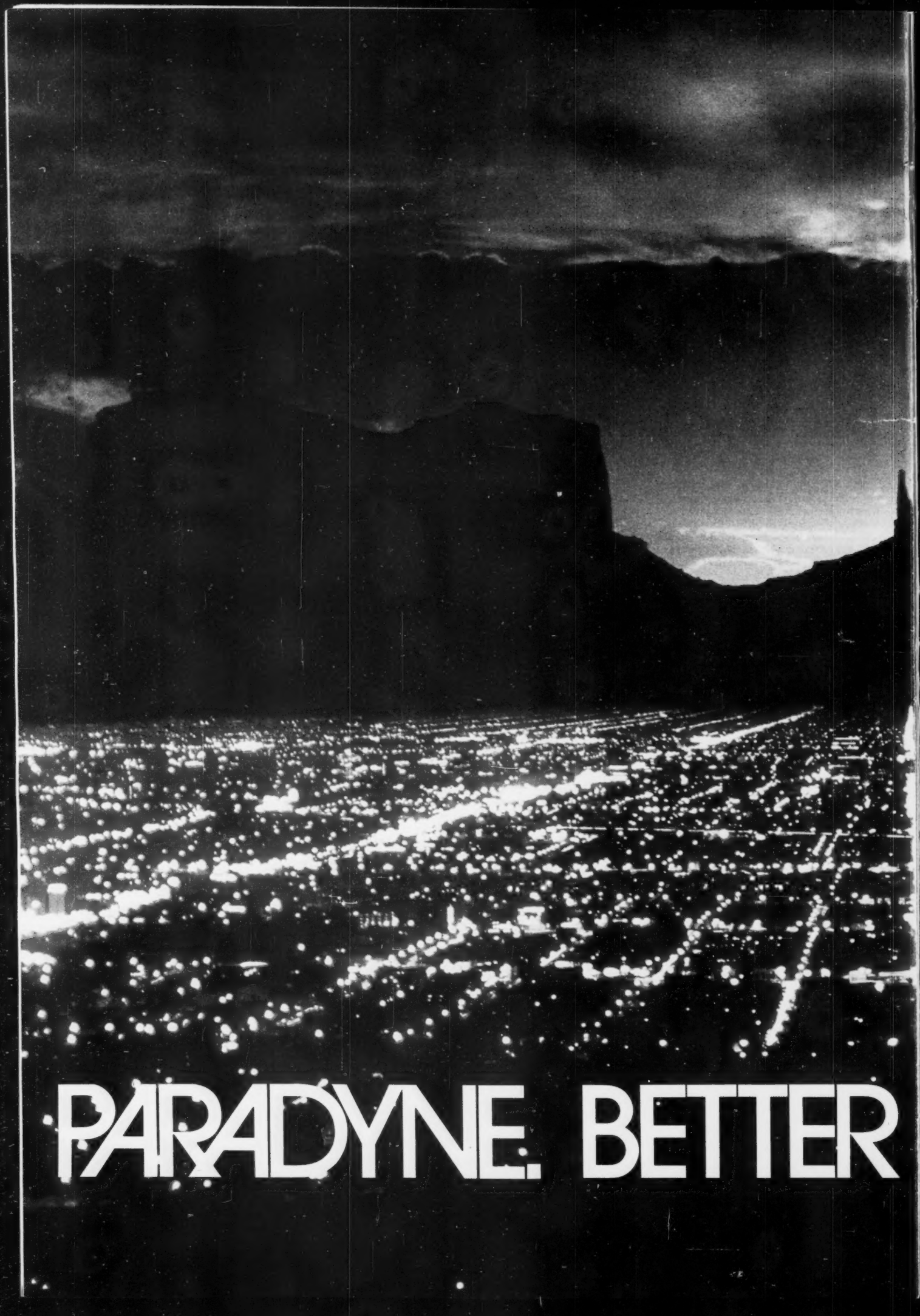
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Supplement to January 8, 1979.
Volume XXVII. Number 2.

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4	3	CHEMICAL ENGINEERING	11,573,000*	11,005,000*	+ 5.2
5	4	PLANT ENGINEERING	11,375,000	9,916,000	+ 14.7
6	5	OIL & GAS JOURNAL	9,961,507	9,049,915*	+ 10.1
7	6	ENGINEERING NEWS-RECORD	9,863,000	8,828,000	+ 11.7
8	8	ELECTRONIC DESIGN	8,948,357	7,165,530	+ 24.9
9	10	AVIATION WEEK	8,311,000	6,807,000*	+ 22.1
	14	DATAMATION	8,155,000	6,252,000	+ 30.4
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Yankee Group Study Predicts

'Active' Phone Management on the Increase

CAMBRIDGE, Mass. — A general-purpose processor combined with telecommunications software will enable almost any firm to effectively manage its telephone system, lowering calling costs and improving the overall grade of service.

As a result, the demand for such systems will increase significantly as more manufacturers seek to enter the growing market for "active" telephone management.

These are some of the trends outlined in a study recently completed by The Yankee Group, a research and consulting firm here. The results of the study are the focus of the latest issue of *Telecommunications Analysis and Research*, a report published by the firm.

Active vs. Passive

According to the report, user demand for detailed reporting of telephone expenditures has not been very widespread. However, as telephone costs continue to rise, firms are examining their expense reports more closely, looking for places to "trim the fat."

With a computer-controlled telephone management system, accurate, timely reports on usage, traffic and costs are available on demand. In addition, such a system can automatically route calls over the least expensive available line, deny certain users access to long-distance or toll facilities and diagnose and indicate system malfunctions, the report noted.

Such computer-controlled systems are referred to as "active," to differentiate them from the "passive" systems which provide detailed reports on traffic and costs. However, these passive systems cannot automatically route calls or deny access.

The study stated that while the passive systems are less expensive and applicable to a variety of situations, they will be superseded by the more powerful active systems, especially as decreased processing costs erode the price differences between the two.

Two firms, Datapoint Corp. and Action Communications, have been the industry leaders so far, according to the study. Any vendor which can program a minicomputer to do telephone management can provide a system, it added.

New offerings are appearing, and more can be expected. In addition, manufacturers of automated telephone switching systems (PBX) will begin to offer more management capabilities with their devices, either as add-ons to existing systems or built into newer ones, the study predicted.

Further information on the study can be obtained from The Yankee Group, P.O. Box 43, Cambridge, Mass. 02138.

Seminars Set On Net Design

DELRAN, N.J. — Datapro Research Corp. will offer a seminar on data network analysis and design in four major cities in the second half of 1979.

Material will be presented on switched network and private line systems; batch and transaction processing; and half- and full-duplex protocols, Datapro said. James Martin's *Systems Analysis for Data Transmission* will be the text.

Substantial amounts of class time will be spent in applying theory to practical problems in network design, Datapro stated. Attendees are expected to bring calculators for use in "extensive computational exercises."

The course will address statistics for network analysis; queuing theory; switched network design theory, including calculation of ports required on a time-sharing system; and "the throughput equation."

Other topics include analysis of transaction processing systems, including modification of queuing equations to allow polling; and discrete event simulation.

The seminar's instructors will be Ralph G. Bergland, a management and technical consultant in data communications, and Doug Smith, a specialist in network design and communications system simulation.

The seminar is scheduled for Sept. 13-15 in New York City; Oct. 4-6 in San Francisco; Nov. 13-15 in Chicago and Dec. 4-6 in Washington, D.C.

Registration costs $435 for Datapro subscribers and $485 for non-subscribers. When three registrants from a single company register, a fourth from the company can attend free.

Additional information is available from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

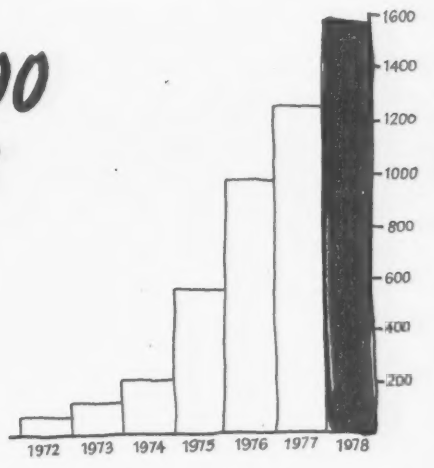
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DDP Tools Designed for Burroughs B860, B870

(Continued from Page 33)
faces to Burroughs and IBM mainframes and other host computers as well as interfaces to commercial packet-switching services and to network architectures, a spokesman noted.

Links Between Programs

Program-to-program communications is provided by the System Communication Module (Sycom), which is used when data maintained by one computer is needed by a program being executed in another computer.

Sycom allows the operator of a terminal that is linked to one CPU to converse with an interactive program that is running on another CPU in the network. It permits the transfer of data files between two local or remote computers, the spokesman said.

Sycom also allows a computer to concentrate messages from multiple terminals so they can be forwarded to a central system over a single communications line rather than over several lines, he added. It interfaces B860 and B870 systems to larger Burroughs mainframes and through them to networks based on Burroughs Network Architecture (BNA).

The ability to enter data from multiple terminal units is provided by Odesy. A terminal operator enters data by following formats displayed on the terminal screen

Data is automatically checked for logical errors, audited, verified and formatted, thus providing corrected information for use by application programs. Odesy allows operators at as many as eight Burroughs TD830 CRT terminals to communicate with a B860 or B870 at the same time, Burroughs said.

With these same terminals, users at remote sites can create and update information files and develop programs on-line using the Cande language adapted from Burroughs large-scale systems.

The TDS provides the control required for the concurrent operation of Sycom, Odesy, Cande, network interfaces and user application programs. TDS includes a message control system to supervise the communications flow and a pregenerated version of Burroughs Network Definition Language (NDL), which reportedly simplifies the procedures involved in establishing a local network of terminals and later changing or expanding the network.

An interface allows a B860 or B870 to communicate with a batch processing IBM CPU or "certain other computers" by simulating an IBM 2780 or 3780 terminal. The B860 and B870 also function in unattended mode.

They may be used for data entry and data collection during the day and then communicate with a central DP site after hours. This way data for report printing is on-hand at the opening of business the next morning.

For interactive processing with an IBM CPU, the B860 or B870 uses the IBM 3270 CRT system's data line protocol.

Burroughs CMDIS also includes an X.25 interface.

The CMDIS system of program products is available for $16,360 and an annual license fee of $1,915. Individual CMDIS elements are available for one-time payments ranging from $600 to $2,500 and annual license fees of $175 to $250.

Cande and TDS are now available. Other elements and interfaces should be available by the end of the first quarter.

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The Bantam. The cocky new $599* CRT that just changed the pecking order.

User Need	Feature	P-E BANTAM	LSI ADM-3A	Hazeltine 1400	Hazeltine 1500	Adds Regent 100
Easy to read display	7 x 10 matrix for highly legible characters	Yes	No	No	Yes	No
	Black on white or white on black display	Yes	No	No	Yes	Yes
	Display set deep in hood to reduce glare	Yes	No	No	No	No
	Full 24 x 80 display	Yes	Yes	Yes	Yes	Yes
	Full upper and lower case	Yes	Option	No	Yes	Yes
	Non-glare screen	Option	Yes	No	Yes	Yes
High operator throughput, low operator fatigue	Tab stops/tab key	Yes	No	No	Yes	Yes
	Backspace key	Yes	No	No	Yes	Yes
	Repeat key	Yes	Yes	No	No	Yes
	Shiftlock key	Yes	No	No	No	No
	Separate print key	Yes	No	No	No	Yes
Convenient switching Local/on-line	Local—remote key	Yes	No	Option	Option	Yes
International Character sets	French/German/ Swedish/Danish/ British/Spanish	Option	Option	No	Option	Option
High speed numeric	Integrated numeric pad	Yes	Option	No	Yes	Yes
Convenient system interfacing	RS-232/CCITT-V24	Yes	Yes	Yes	Yes	Yes
	Current loop	Option	Yes	No	Yes	Yes
Simplified program debugging	Transparent mode and displayable control characters	Yes	No	No	No	No
Faster maintenance	Self-test	Yes	No	Yes	No	Yes
Minimum desk space	Small size	15Wx 19Dx 14H	15.5Wx 20.2Dx 13.5H	15.5Wx 20.5Dx 13.5H	15.5Wx 20.5Dx 13.5H	21Wx 23Dx 14.5H
Printer port	Printer port	Option	Yes	No	Yes	Option
Cost effectiveness	Qty. 100 OEM price	$599†	$740	Less than $550 in quantity 1000	$860	$895

*In quantities of 100.
†Qty. 1, End User Price $966.

Unit Tests Modems' Polling Performance

LINCOLN, R.I. — Designed to test the polling performance of asynchronous and synchronous data modems, the Model 1700 polling tester from International Data Sciences, Inc. (IDS) is the latest offering of the firm's data communications test equipment.

The Model 1700 reportedly can be used to test modems over either simulated or actual switched networks, private-line point-to-point networks or private-line multidrop networks.

A special feature of the microprocessor-based unit is said to enable the 1700 to be installed between modems and their associated terminal equipment in on-line data communications systems to improve maintenance efficiency.

As an aid in targeting system malfunctions, the Model 1700 can distinguish between outbound and inbound polling message errors, IDS said. The unit permits the deliberate injection of outbound and inbound polling message errors for quick verification of data network continuity, according to the firm.

Standby Mode

During normal system operation, the polling system is in a standby mode, permitting normal data flow, a spokesman explained.

Unattended polling testers in the standby mode can be put into a test mode from a central site under control of the master polling tester. When this system is configured with an IDS Model 1310 time division multiplexer-modem test set, a polling test and a digital loopback bit error rate test can be applied, the firm said.

A Model 1700 can be selected as a master or remote unit with a switch, the spokesman said. As a remote switch, just the address and data rate switches need to be set, he said.

Remote polling testers have a built-in feature that restores the unit to normal operation in the event of a failure in the communications system.

The Model 1700 costs $1,800 from IDS at 7 Wellington Road, Lincoln, R.I. 02865.

Nobody ever offered you a tough, high quality, compact CRT like the BANTAM before. At $599 or any price. Designed for hectic office environments. And, human engineered to make an operator's life easier.

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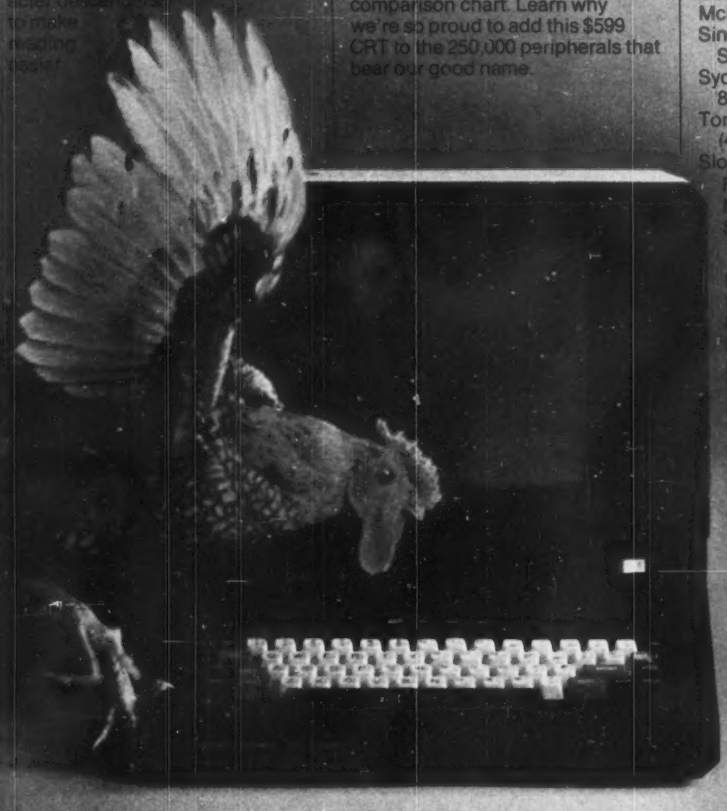
A switchable white-on-black or black-on-white display, whichever your operator prefers. An easy-to-find cursor that frames the entire character position in a transparent, inverted video block.

Plus plenty of options you can't get with CRTs costing much more. Like our low-cost Pussycat page printer. A full range of foreign language character sets. We even have a model you can switch from ASCII to full overstrike APL.

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Only an industry leader like Perkin-Elmer could do it. We designed a powerful, custom LSI controller chip that makes the BANTAM the one and only high quality CRT in its class.

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For more information call or write Perkin-Elmer Terminals Division, Randolph Park West, Route 10 & Emery Avenue, Randolph, N.J. 07801 (201) 366-5550. Or contact any of our sales offices. Then watch the feathers fly.

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PERKIN-ELMER
Data Systems

Data Entry CRT Offered By Hazeltine

GREENLAWN, N.Y. — A teletypewriter-compatible CRT terminal with features for data entry and data inquiry has been introduced by Hazeltine Corp.

The Model 1410 terminal is based on Hazeltine's earlier microprocessor-based CRT terminals, the 1400 and 1500 series. The microprocessor design in the 1410 permits utilization of fewer parts, the firm said.

The CRT operates with a standard RS-232 interface with eight transmission rates up to 9,600 bit/sec which are switch-selectable, accommodating all 128 Ascii codes.

The Model 1410 will be priced at $580 in quantities of 1,000, including a two-year return-to-factory warranty.

Hazeltine is at Cuba Hill Road, Greenlawn, N.Y. 11740.

LA36 Controller Gets Price Cut

CHARLOTTE, N.C. — Datasouth Computer Corp. has reduced the price of its DS120 terminal controller for the Digital Equipment Corp. LA36 Decwriter.

The DS120, designed to upgrade the 300 bit/sec LA36 to 1,200 bit/sec, has been reduced from $885 to $750 per unit.

The unit features microprocessor control, 165 char./sec bidirectional printing, forms control package, EIA and current-loop interfaces and 110- to 4,800 bit/sec line operation.

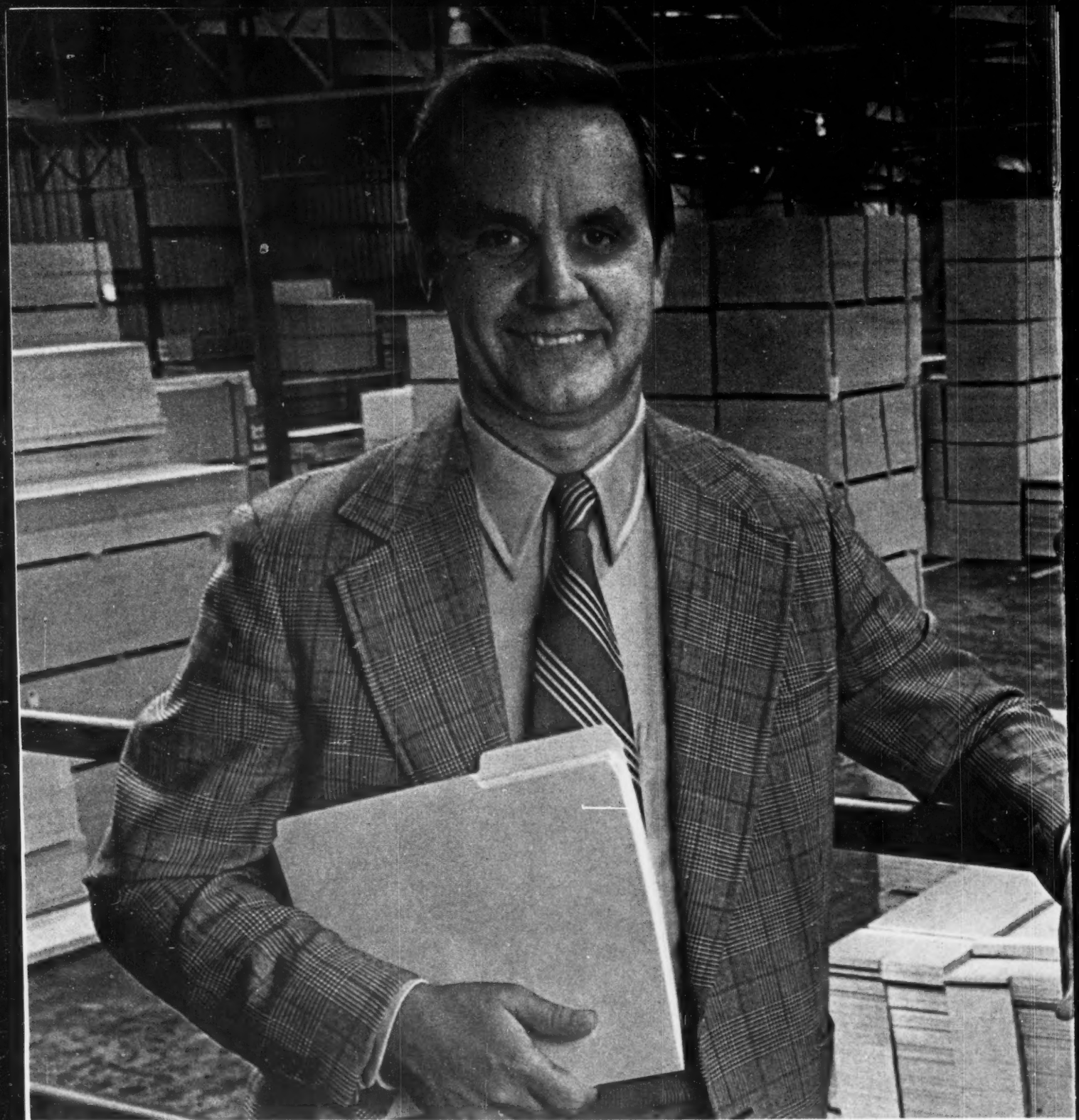
Datasouth is located at 627-F Minuet Lane, Charlotte, North Carolina 28210.

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"By putting the IBM Series/1 where our people are, we're giving them local control of their operations that they couldn't get through our central computers alone," says Paul Pavloff of Champion International, a major producer of building materials, papers and paper packaging.

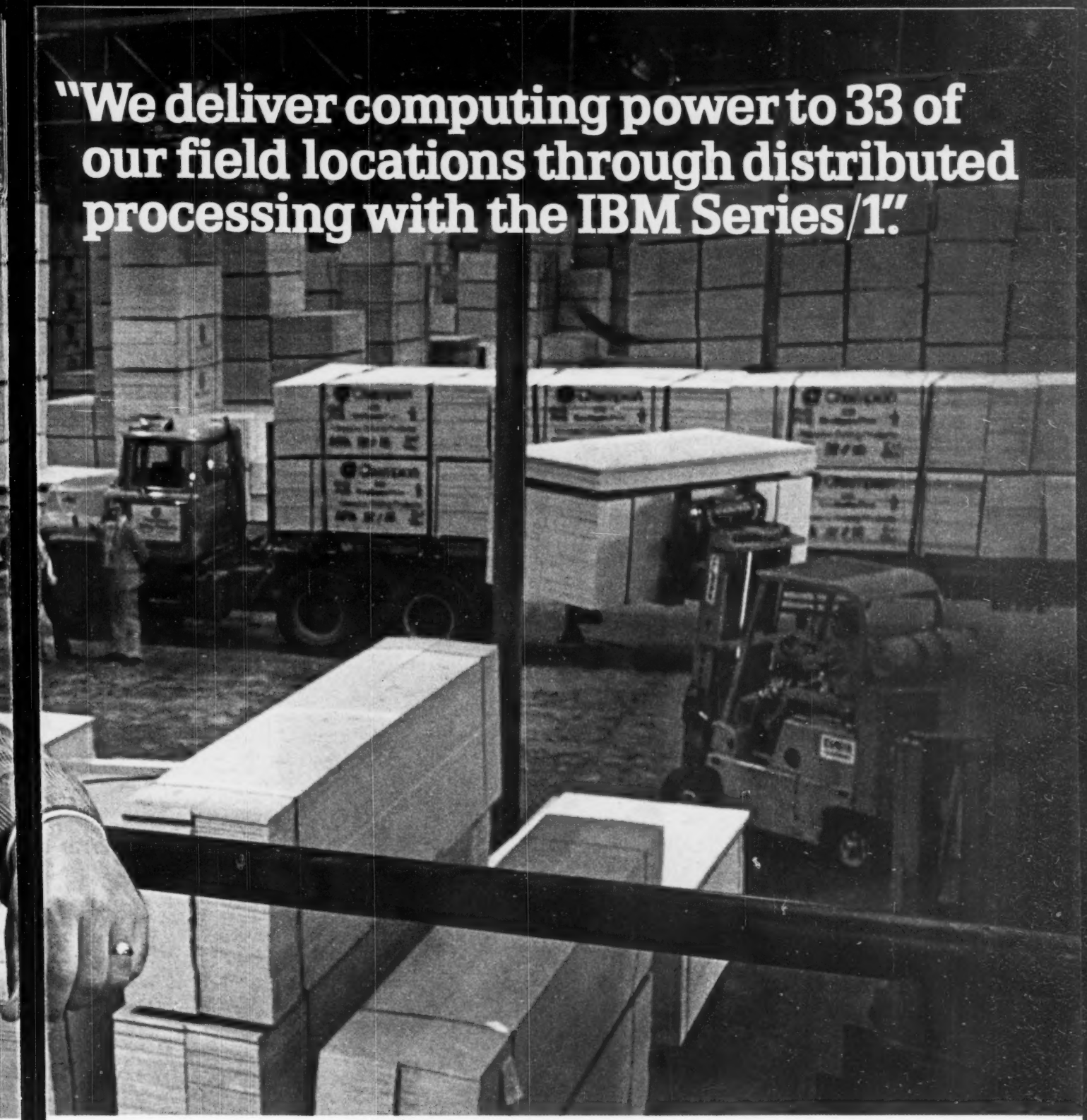
"Thirty-three Champion distribution centers now have their own Series/1 for such functions as order entry, invoicing and inventory control," he continues. "At night, each Series/1 transmits consolidated data to our large IBM computers for timely management use. And they're helping us plug profit leaks through better control of inventories and complicated pricing schedules.

"All in all, our Series/1 units start to pay for themselves from the day they go on line. By 1980, we expect to equip over 150 field locations with them."

To achieve full distributed processing capability at so many remote locations and integrate those stations with the central computer, Champion developed its own versatile data management system, including a unique programming language.

The IBM Series/1 is small enough to fit almost anywhere, flexible enough to manage a variety of data processing tasks and powerful enough to handle both remote termi-

"We deliver computing power to 33 of our field locations through distributed processing with the IBM Series/1."



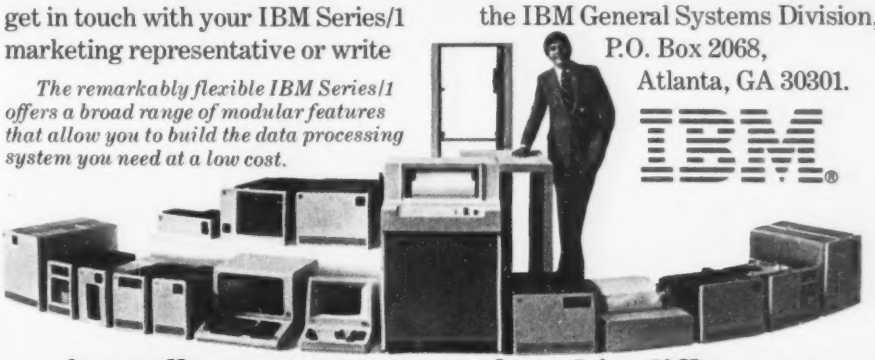
Paul Pavloff, Vice President, Management Information Systems, Champion International Corporation

nal and central information processing. It features online capability so that information is available to you at any terminal just as quickly as it's processed. And because it's modular, Series/1 is ready to grow when you are.

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The remarkably flexible IBM Series/1 offers a broad range of modular features that allow you to build the data processing system you need at a low cost.



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Martin to Give Seminars on Net Environments

LOS ANGELES — Emerging DP and communications environments and how to design for them will be covered in a series of five-day seminars presented by author and lecturer James Martin.

The seminar series will be held in New York March 19-23; Miami Beach, March 26-30; Toronto, April 23-27; and in San Francisco, April 30-May 4 under the auspices of Technology Transfer, Inc. of Los Angeles.

In another meeting, which will be held in Washington, D.C., March 7-9, Martin will team up with Leonard Kleinrock, head of Technology Transfer, for a three-day conference on "Tomorrow's Networks."

Future of ACS

With them will be William R. Smith of AT&T, who will discuss the future role of AT&T's Advanced Communications Service (ACS) in data communications, and two other industry leaders, B.O. Evans of IBM and Lawrence G. Roberts of Telenet Communications Corp.

The Martin seminars are reportedly geared to DP professionals concerned with current and potential applications of the new technologies and their impact. Martin will discuss the interrelation and likely direction of distributed processing, teleprocessing, data base and networks.

Martin will devote part of his seminars to the use of intelligent networks such as ACS and other value added networks and the importance of standards such as X.25.

Some Participants

Contributing to the discussion of network alternatives in the New York seminar will be Howard Frank, president of Network Analysis Corp; in Miami and San Francisco, Kleinrock; and in Toronto, Andrew McMahon, vice-president of computer communications for Bell Canada.

The Martin seminars in New York, Miami Beach, Toronto and San Francisco cost $975. The three-day Washington seminar is priced at $595.

Information on the seminars can be obtained from Technology Transfer, Box 49765, Los Angeles, Calif. 90049.

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Unit Backs 6800 Micro

LAFAYETTE, Ind. — Wintek Corp. has introduced a 16K-byte development system for the Motorola Semiconductor Products, Inc. 6800 series of microprocessors that includes a single-board CPU, 16K random-access memory, RS-232 interface and switch-selectable transmission rates.

The package also includes 300 bit/sec and 2,400 bit/sec cassette interfaces, Wintek's Fantom-II monitor/debug read-only memory, editor/-assembler software, card rack, backplane and power supply, a spokesman said.

The total cost of components is $1,079, but the complete package goes for $902, Wintek noted from 902 N. Ninth St., Lafayette, Ind. 47904.

Micro800 Gains Rack-Mounting

CHATSWORTH, Calif. — Micom Systems, Inc.'s Micro-800 data concentrator is now available with a rack-mount option to facilitate multiple installations at a DP site.

The option consists of a slide-in assembly containing printed circuit modules and power supply mounted in a 19-in. rack-mount chassis, with a snap-on plexiglas cover for the front of the chassis.

Panel height is 3.5 in. for two-, four- and eight-channel units and 5.25 in. for 12- and 16-channel units.

The rack-mount option is available free. The basic Micro800 costs $1,150. Micom is at 9551 Irondale Ave., Chatsworth, Calif. 91311.

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Inforex 3100, 3200 Unveiled

Key-to-Disk Units Aimed at New Users

BURLINGTON, Mass. — In a move aimed at capturing lower volume and first-time users of key-to-disk equipment, Inforex, Inc. has added two systems to its line of offerings. The systems are said to provide users with greater flexibility in data entry and a limited amount of computing power.

The System 3100 comes with 40K bytes of memory and 2.5M bytes of disk storage. Up to 384 entry "programs" can be stored in the unit, which also offers 20 reformatting levels that allow users to rearrange and/or edit data prior to putting it on tape, the firm said.

In addition, the unit can store up to 60 user-defined tables containing employee or customer name files and other data; these can be used for data validation, range checking and similar operations, Inforex said.

Additional Features

Other features on the unit include virtual program control, auto-scan verification and disk communications capabilities.

The virtual program control facility permits users to transfer selected portions of larger documents, while the auto-scan verification feature allows an operator to search through a completed batch of data for any specific character or error flags.

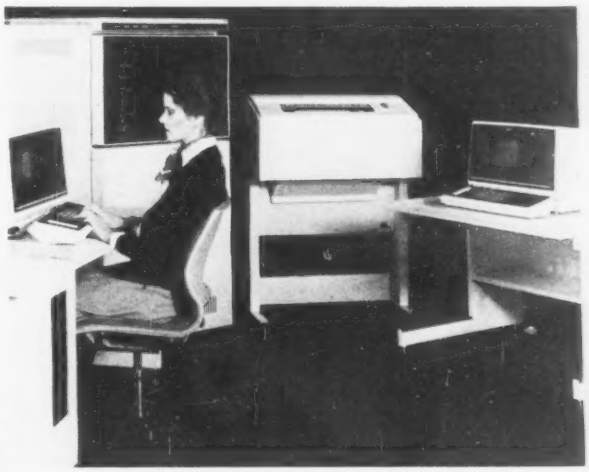
The System 3100's data communications capabilities include bisynchronous protocol and emulation of IBM's 2770, 2780, 3780, 3741 and other remote batch equipment. Supervisory control capabilities include monitoring of individual operator productivity using statistics such as number of records keyed and errors made.

The unit can support the operation of up to 16 data entry stations at once, the firm stated.

The Second Offering

The System 3200, also introduced by the firm, includes all the facilities available on the 3100, as well as a Cobol compiler. Although the compiler offers a fairly wide range of operations, a spokesman noted, it is not intended for heavy-volume, sophisticated DP operations. Instead, it is aimed at offloading simpler jobs from a mainframe.

Users get 64K bytes of memory from the System 3200 and disk storage expandable from 10M bytes to 40M bytes in 10M-byte increments. The system supports up to 16 terminals.



The Inforex, Inc. System 3200

A typical System 3100 configuration including a 40K-byte processor, a 2.5M-byte disk drive, a 12.5 in./sec tape drive and eight CRT/keyboard operator stations will lease for $731/mo, plus maintenance, on a 42-mo contract. The system, targeted for delivery soon, will sell for $49,240.

The System 3200 with a 64K-byte processor, a 10M-byte disk, a 45 in./sec tape drive, a 600 line/min printer, a communications interface and eight CRT/-keyboard operator stations will lease for $1,554/mo, plus maintenance, on a 42-mo contract. The $89,630 system is scheduled for delivery in July, the company said from 21 North Ave., Burlington, Mass. 01803.

User Focuses on Service, Not Technology

By Jay Woodruff
CW Staff

CHICAGO — Some companies approach DP with an eye for acquiring the most powerful, ultraefficient and cost-effective hardware and peripherals. Others, like Sunbeam, Inc., have sizable systems, but subordinate technology to maximum service for users.

"We're not technology buffs out to get the biggest or the best," Sunbeam's DP manager, Curtis Neimeister, said. "Our concern is how we can provide better service."

Neimeister provides this DP service for Sunbeam Appliance Co., the largest part of the conglomerate, as well as other Sunbeam subsidiaries, using "just about all IBM equipment." DP services for some of the remaining 90 companies under the Sunbeam umbrella are provided by the companies themselves. For instance, Oster Corp. uses a 370/148.

Sunbeam runs several on-line systems. The order entry system ties headquarters to seven other plants in the southern U.S. and Mexico. An on-line manufacturing query system and a financial system give Sunbeam "the ability to manage income statements, liabilities and assets of the Sunbeam-owned companies, correlating them for annual reports of the conglomerate," Neimeister explained.

In addition to a 2M-byte 370/148 at headquarters, the company has 10 spindles of 3350 storage and nine tape drives.

"Cobol is the only language we use for applications development," the DP manager said. "It requires management's approval to use any other language, because we are concerned with keeping communications easily accessible to the greatest number of people. Where necessary, there is some assembler programming."

Consulting Group

Any purchase or lease of computer equipment at the center is approved by Sunbeam Corporate Management Services (CMS), a

(Continued on Page 46)

Instant Cure for Computer Indigestion

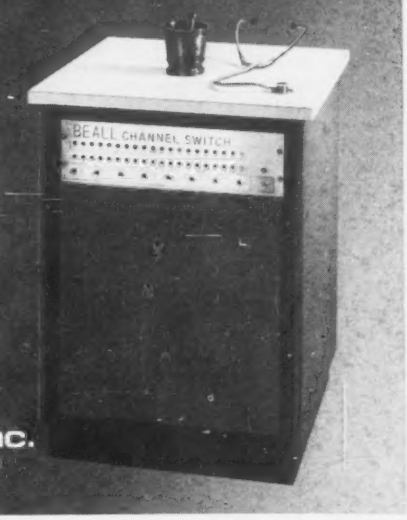
The Beall Channel Switch. Directs critical on-line services to another CPU when failure occurs. Allows specific peripherals to serve more than one computer. Redrives all CPU signals to give you far more flexibility for physical placement of peripherals.

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Microcode Fundamentals — Part 3

System Rigidity, Software Inefficiency Bridged

By Mike Senft
Special to CW

Compared with conventional programming, microcoding requires a considerable amount of hardware awareness to succeed. In some companies, systems programmers are often called upon to develop software for a computer that is not yet available or perhaps exists only on paper.

To do this, they typically build a translator or simulator on an available machine for use by the entire software development team.

Simulators, typically written in a high-level language, are required to translate a "foreign" instruction to the appropriate sequence of actions needed to ensure equivalent execution on the host CPU. The goal of the simulator builder is to create a programming environment which will ensure that the code written by users of the simulator will run unchanged on the real computer and, obviously, produce identical results.

In theory, nearly any computer can act as a host mainframe for simulation, but one simulated machine instruction can require an execution of 100 or more host machine instructions. To make sure that the desired results are obtained with the minimum development effort and the best possible run speed, the simulator implementer usually selects as the host the most powerful system available to him. Power usually denotes large word size, extensive main memory and an elaborate set of support software, which is used to develop an interface with the simulator.

When the simulator is active, it resides in the host's main memory along with the host's operating system. Also in main memory is the software that has been developed for the target machine.

The amount of host memory a simulator occupies will be proportional to the complexity of the system being simulated and the size of its associated main store.

One very desirable by-product of using a simulator to develop software is the ability to "instrument." It is very easy to be wrong in guessing what happens inside a computer while it is executing a program; since the cost of software development is so great, anything that makes it easier to write or debug software is worth money.

Since the programmer is really working with a "soft" machine, the simulator can provide invaluable information for debugging that very often is not available on the "real" machine — trace, breakpoints, register contents and monitors and memory protection, for example.

Pluses and Minuses

So simulation has three advantages: it allows software development to take place in parallel with hardware development; it uses support software that may never be available on the real hardware (e.g., a general-purpose operating system that provides utilities and offers time-sharing); and it allows the software being created to be "instrumented."

Interpretive computer simulation, while it has advantages, also has several disadvantages that limit its general use:

- It is slow. Because of the number of host computer instructions that must be executed to simulate one target instruction, it generally takes 1 msec or more to execute what is executed in microseconds on the target processor.
- It is incomplete. It is usually not possible to accommodate the integration of the "real" I/O, and it may be very difficult to simulate I/O because of interpretation difficulties.
- It is costly. Simulation typically requires a large third- or fourth-generation machine to be the host in order to satisfy architecture requirements. Even then, the simulator may only run at .01 to .001 the speed of the "real" machine. A simulated one-hour run might therefore take 100 to 1,000 real hours.

However, if a simulator could run in a high-speed memory rather than main memory, as microinstructions do, it could execute proportionally faster. Obviously, with simulators as large as they are and high-speed memory costing as much as it does, this could add considerable cost to the selling price of the host system.

In reducing runtimes, however, more users could be accommodated and more complete simulations could be attempted; therefore, the upgrade could potentially pay for itself.

Conventional emulation can be defined as simulation with hardware assistance (microcode) to make it run faster. Most user organizations, instead of upgrading their large general-purpose systems to support simulation, would rather make the smaller investment in a supermini with writable control store.

Simulation code can be optimized via microcoding, and the number of main store memory fetches substantially reduced. It is common for an emulator to run 10 times faster than a simulator and still enjoy all the advantages of simulation covered earlier.

Special Requirements

Computer systems can now be viewed as hardware, software and microcode. Microcode serves to improve the performance of software and make pliable the inflexibility of hardware.

Most computer users are looking for high-speed, general-purpose capability and find acceptable the standard hardware/software packages provided by the manufacturer. However, there are still users who are not satisfied.

To users with special-purpose requirements — and to still others trying to protect an existing software investment that runs only on a nonstandard machine — an in-house microprogrammable system has definite appeal.

There are scores of systems in operation today that have been microprogrammed by the user. The applications these machines can satisfy are seemingly endless, but the most common are:

- Interpretive computer simulation replacement.
- Emulation of nonstandard machines.
- Hardware/software trade-off analysis.
- Directly executable formula or language machines.
- Software design, development and verification.
- Hardware design and verification.
- Computer architecture studies and advanced or applied research.
- Centralized support of many kinds of systems geographically distributed by having one microprogrammable system and many emulators.

Neither Mystery nor Panacea

Microcode is neither mystery nor panacea. To the manufacturer, it is a practical way to provide a greater system life expectancy; to the user, it can mean investment protection for existing software.

Microprogramming is not the programming of a microprocessor, nor is it routinely written by Cobol programmers. To the manufacturer and the end user, it is the bridge between the inflexibility of hardware and the inefficiencies of software.

Emulation will allow a manufacturer's system software and a user's application software to run unchanged, provided it is not time-dependent. But it will require a more powerful host to begin to approach running at real-time speeds.

Microinstruction types, word widths and control memory sizes are not arbitrarily decided. They conform to a predetermined manufacturer's strategy in building, selling and supporting the product.

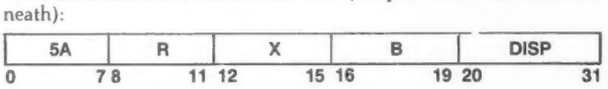
This is the conclusion of a three-part series. Senft is director of marketing with Nanodata Corp. of Williamsville, N.Y., which manufactures several systems that rely on microcode.

An Example

As an example of the way microcode works, consider the ADD instruction used in IBM 370 BAL. When the instruction executes, it adds the contents of a location in memory to a general-purpose register (GPR) ("to" address) in the system.

The address of the data to be added to the register ("from" address) is determined by adding up three components of the address: the displacement, the contents of the base register and the contents of the index register.

The BAL instruction looks like this (bit positions shown underneath):



In the illustration, 5A represents the operation code, R represents the "to" register; X represents the index register; B represents the base register; and DISP represents the displacement.

The machine on which the microcode is executing has a 1K-byte high speed scratchpad memory, a large core memory and eight local registers. These registers, which should not be confused with the GPRs, are assigned as follows:

MAR — Core Memory Address Register.
MDR — Core Memory Data Register.
R.R — Holds R field of the BAL instruction.
R.B — Holds B field of the BAL instruction.
R.X — Holds X field of the BAL instruction.
R.DISP — Holds Disp field of instruction.
R.PC — Holds current program counter.
R.WK — Working scratch register.

To get the ADD instruction to perform its task, the microprogrammer would write the following sequence of microcode instructions:

Microprogram Instructions	Comments
R.WK=0	Clear work register
IF (R.B .EQ. 0) SKIP	Check for zero in base register
R.WK=SCRATCHPAD (R.B)	Load R.WK with base
MAR=0	Clear MAR
IF (R.X .EQ. 0) SKIP	Check for zero in index
MAR=SCRATCHPAD (R.X)	Load index into MAR
MAR=MAR+R.WK	Calculate base + index
MAR=MAR+R.DISP	Add in displacement
* (At This Point The Operand Address Is In The MAR)	
READ, R.WK=SCRATCHPAD (R.R)	Fetch both operands
R.WK=R.WK+MDR	Add the operands
SCRATCHPAD (R.R)=R.WK	Store back the updated GPR
GO TO FETCH	Return control to system

Toffler to Keynote IWP June Conference

CHICAGO — The International Word Processing Association (IWP) will hold its annual conference and equipment exhibit, called the Syntopican, at the Palmer House here on June 26-28.

Alvin Toffler, author of *Future Shock*, will be the keynote speaker. He is scheduled to speak on the role of information systems in the business world of the future.

Toffler's address will complement this year's Syntopican theme, "Information Systems in Perspective," a spokesman stated.

Reservation fees are $125 for IWP members and $150 to nonmembers. Further details are available from IWP Conference Services, 2360 Maryland Road, Willow Grove, Pa. 19090.

Center Updates System, Reduces Work Shift

Special to CW

CINCINNATI — A new data entry system is increasing the efficiency of operations at the Regional Computer Center for Hamilton County and the City of Cincinnati and has allowed the center to eliminate one shift from the data entry operation.

The center serves Cincinnati, surrounding Hamilton County and more than 50 autonomous law enforcement agencies in Ohio. It also maintains criminal records, vital statistics, supplies inventory, fleet management and cost accounting data as well as payroll records for the various governmental agencies within the county and the city.

Established in 1967, the center was the first in the country to combine the needs of county and city governments into one facility, thus eliminating much duplication of effort while maintaining the privacy of the records.

Updated in '77

The data entry equipment was updated from a key-to-tape and key-punch system to a key-to-disk system using CRTs. "Management began to look for more efficient methods of operation in early 1977 and also wanted the Health Department to be on-line with any system that was installed," according to Jon Sears, manager of the center's Operations Division.

"After establishing specific criteria for our internal and our client needs, we called suppliers to start the competitive bidding process," he said.

A Cummins-Allison Corp. Series 5400 key-to-disk system was selected and installed in May 1977. The system consists of a 96K-byte processor, a 9.8M-byte disk drive, a 600 line/min printer, a 300 card/min reader and 10 CRTs.

"Cummins' price/performance ratio with the other systems was very competitive," Sears said, "but the big advantage for us was the Indexed Sequential Access Method capability that allows data on the disk to be accessed quickly. This enabled us to eliminate the reentering of constant data, and it reduced the number of keystrokes by 40% in the City of Cincinnati payroll application."

Another system feature that Sears called an excellent management tool allows the manager to measure the average keystrokes per hour for each CRT operator. "That feature gives me the kind of information I need in order to run an efficient operation," Sears said.

According to work performance charts that Sears maintains, some trainees who started at 2,000 keystroke/hour typed more than 9,000 keystroke/hour four weeks after starting on the key-to-disk system. "The system is easy to learn, which really helps in making it productive within a short time," he noted. All employees are expected to maintain a minimum of 11,000 keystroke/hour.

Clients Assign Priorities

Four terminals installed in a remote client environment have also been time-savers for both clients and the center, according to Sears.

"Clients don't have to fill out as many forms as before and, at our end, we don't have to worry about entering all their data on cards. We've eliminated many of the problems associated with a centralized data entry operation, and the clients feel more comfortable about the computer because they're entering their own data," he said.

"With the terminals, clients can assign whatever priority they want to the material, rather than shipping it to us and waiting for it to be returned," Sears added. "They enter the data, hit a key and know they're done with it. They get turnaround on the material within 24 hours. Even though there isn't a great saving of time for the overall project, from the client's viewpoint the material is not out of his hands for as long.

Future Applications

Future applications for the system may include remote entry of payroll information — currently done in-house — and the addition of an optical scanner in the waterworks department for meter readings.

"The name of the game for us is to stimulate growth and reduce costs. Our clients are paying a proportionate share of the system's cost. Our initial cost — with CRTs in the municipal garage and in the health department — was $900/mo, and adding the sewer district knocked our costs down even further. Every time we add a new service, we are reducing our costs and making better use of the system," Sears said.

Sears has been able to halve the number of shifts and reduce personnel for data entry while expanding services. "The service and software support from the Cummins' people has been excellent," he added. "They have gone far beyond what the contract called for in terms of service."

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(Continued from Page 43)
group of systems analysts that also provides a consulting service for some of the smaller Sunbeam companies that do not have the resources to do all their own research.

CMS helps these firms review and select equipment, but does not pressure the companies to buy particular brands, such as IBM products. "They're pretty much left on their own as long as they get their capital appropriations approved," Neimeister remarked.

Sunbeam does not use its computing facilities for product design except to keep bill of materials records under development in case the product is later put into production. "We've looked at video design software from IBM, similar to that used by General Motors Corp.," Neimeister said. "Our Research and Development people have expressed an interest in it, but it will probably be years before we seriously consider it."

The company runs its system under OS/VS1 and uses CICS for telecommunication monitoring. Roscoe, produced by Applied Data Research, Inc., is used for interactive programming and control of job submission. "We're a cardless shop as far as job submission is concerned," Neimeister noted.

In the third quarter of 1976, Sunbeam installed Cincom Systems, Inc.'s IDMS data base management system, which provides controlled access to data files and records. "We're very satisfied with the performance IDMS gives us," the DP manager said, "because we can rely on our data.

"If an Abend occurs, IDMS can automatically back out everything to the beginning of the program. We can fix it and then run it again. The system gives us security and integrity."

The processing center is rewriting some of its older programs that are eight to 10 years old, "so we can take better advantage of the technology we have today," Neimeister said. Eventually, all applications will be brought under IDMS control, he indicated, reducing the possibility of errors.

Sunbeam is considering add-on gear, 1M bytes of California Computer Products, Inc. memory, as well as Calcomp disks and tape systems. "We've had some bad experiences here with add-on gear," Neimeister stated, "so support is a real consideration for us."

As a result, Sunbeam has approached cautiously the acquisition of add-on equipment. "We're looking, but there's a big difference between looking and getting," he observed.

Improvement Groups

In his one and a half years at Sunbeam, Neimeister has directed his efforts toward a more reliable operation and has tried to improve ties between DP operations and upper management. The data center was experiencing what he called a "very high failure rate" on its systems, often with as many as 25 blowups a day.

To attack this potentially crippling problem, Neimeister formed and led a maintenance group to reduce the failure rate. "From last February until the following summer, system failures were often reduced to zero," he said.

The data center manager has bolstered the performance and confidence of the DP staff. Many DP staff members at the center had good DP skills, but lacked management skills, he said.

A management training program was instituted to promote those skills among managers and supervisors. It was coordinated and administered by Sunbeam's Diane Jackson of the industrial relations department.

A special effort has been made to keep upper management informed of DP activities.

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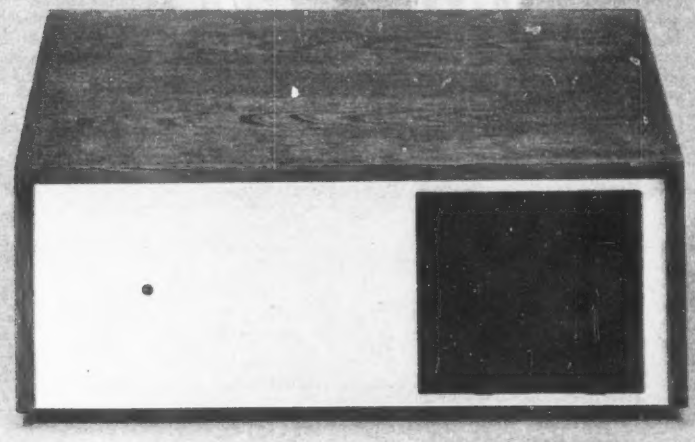
The Horizon can be expanded to 56K bytes or more of RAM, four disk drives (720K bytes), and three built-in I/O interfaces. Performance can be enhanced by the addition of the North Star hardware floating point board. Also, S-100 bus products from other manufacturers may be used to expand the Horizon.



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Memory Cycles in 250 Nsec

SDS Packages Desktop Business System

LOS ANGELES — A desktop small business system that can execute instructions in 100 nsec to 350 sec and has a main memory cycle time of 250 nsec has been announced by Scientific Data Systems, Inc. (SDS).

The Model 420 packs a 2MHz Model 6502A microprocessor, 32K bytes of main memory, Persci, Inc. single/double-density dual-diskette drives and a 12-in. CRT with keyboard into a single cabinet that appears to be not much larger than a conventional terminal.

From 1.5M to 10M bytes of floppy disk storage is available on the Persci drives, SDS said, noting that dual-head drives are optional.

The Model 420 features a Ball Brothers Research Corp. CRT with 25 lines of 80 characters each and an independent 2K-byte refresh memory. An SDS-designed 71-key alphanumeric keyboard accompanies the CRT; the keyboard is detachable and includes a decimal pad, cursor control, reset and interrupt keys and three user-programmable keys.

Basic Interpreter

The system reportedly employs an extended 12K-byte Basic interpreter that delivers all features of standard Basic plus commands for formatted printing, input of strings with embedded terminators and string manipulation commands.

The interpreter also provides a file interface to random, sequential or keyed files with indexed sequential access. It offers I/O



SDS Model 420

device handling, error handling, screen window management and source file editing, SDS continued.

The keyed file interface allows data manipulation programs to be written in Basic using a minimal number of commands, a spokesman explained.

The Model 420's operating system supports program segment overlays, dynamic disk space allocation, flexible file size and organization and device-independent I/O, he added.

The Model 420 business system costs $7,700; OEM discounts are available. The vendor is at 12640 Beatrice St., Los Angeles, Calif. 90066.

HP Revamps 3000 Series III; Reduces Price of Series 33

PALO ALTO, Calif. — Hewlett-Packard Co. has announced an improved version of its top-of-the-line HP 3000 Series III minicomputer that costs $10,000 less than the previous Series III.

Performance remains unchanged, but the latest version is more compact, easier to install and more reliable, HP claimed. Prices for complete systems now begin at $105,000 compared with the previous $115,000.

HP also lowered the cost of its entry-level HP 3000 Series 33 from $70,000 to $58,500.

The latest Series III features low-cost power components and a redesigned system bay that increase system uptime, HP said. This version is fully compatible with all software on the previous HP Series 33, II and III, a spokesman added.

The enhanced Series III system now supports the vendor's languages and utilities; its MPE-III operating system; Image data base management system; and MFG/3000, a manufacturing application software product that is also supported on the Series 33.

The revised Series III price covers 256K bytes of main memory, 50M bytes of disk storage, a 1,600 bit/in. magnetic tape drive, 16 terminal ports, a CRT console and the MPE operating system. The Series III can be expanded to 2M bytes of memory, 960M bytes of disk, eight tape drives and 64 ports.

The reduced Series 33 price covers 256K bytes of main memory, 20M bytes of disk storage, a 1M-byte floppy disk, eight terminal ports, a system maintenance console and the MPE operating system. A maximum configuration supports 1M byte of memory, 960M bytes of disk, four 1,600 bit/in. tape drives and 32 terminal ports.

Both the Series III and 33 use 16K-byte random-access memory with error-correcting capabilities that costs $32,000 per 1M byte.

OEM and quantity end-user discount schedules apply to both the Series 33 and III, HP noted from 1501 Page Mill Road, Palo Alto, Calif. 94304.

SEL Doubles 32/77 Memory

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories, Inc. (SEL) has doubled the maximum memory capacity of its largest minicomputer, the 32/77, and upgraded other models in the 32-bit systems family unveiled last May.

The 32/77's main memory can now be extended to 4M bytes in a 12.5-in. chassis, SEL said. With the Memory Support Package (MSP), up to 16 256K-byte modules of either 600 nsec or 900 nsec MOS memory can be supported. Each Model 2379 module of 600 nsec memory costs $13,500.

An SEL 32/77-20 with the standard 256K bytes of processor memory, 10M bytes of disk storage and a 30 char./sec teleprinter costs $57,400. A 32/77-60 with standard 512K-byte capacity, 80M bytes of disk storage, 75 in./sec tape drive, 600 line/min printer, 300 card/min reader and CRT terminal is tagged at $109,900.

SEL's 32/30A Maxibox and 32/57 Packaged Systems are now available with 600 nsec MOS memory that plugs directly into the logic backplane to increase flexibility of configuration. The Model 2160 module, with 256K bytes of 600 nsec memory, fits both the 32/30A and 32/57 and costs $12,500.

These systems now offer enhanced I/O expansion capabilities to permit larger configurations without additional cabinets and chassis and to lower system costs and consolidate packaging, the vendor added.

The 32/57-20 with 256K bytes of main memory and 10M bytes of cartridge storage costs $47,000. The 32/57-50 with 256K-byte processor, 10M bytes of cartridge storage, 45 in./sec tape drive, 300 line/min printer, 300 card/min reader, CRT and register transfer module software is $72,500.

SEL announced another option for the 32/77 that allows as many as eight processors to share memory. This option consists of an MSP, logic chassis and logic power supply and costs $18,500.

The option must be accompanied at extra cost by one "memory access route" for each processor to be shared, a spokesman noted.

The 32/30 Maxibox nucleus costs $27,300. The 32/57 and 32/77 nuclei cost $34,000 and $46,300, respectively.

SEL is at 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33313.

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Firm Expands to Micrographics

Mini Keeps Production, Shipping Harmonized

BROOKLYN, N.Y. — In making the transition from a solid, traditional industry to a rapidly growing one, companies need all the help they can get. Jefsteel Business Equipment Manufacturing Corp. here turned to a customized minicomputer system for such help.

For several decades, the firm made lateral files, desks, credenzas and other office modules that were sold through a network of dealers. If unspectacular, growth was at least steady.

Then, in the mid-1970s, the company entered the micrographics field with a range of products from microfiche files to microform workstations. The move proved to be wise, and Jefsteel's micrographics now are nationally distributed by Boerum & Pease.

At the same time, Jefsteel expanded its manufacturing plant, adjacent to its headquarters here, and introduced mechanized and automated procedures to speed production of both its office equipment and micrographic lines.

"The company was entering a growth phase," according to Alvin Levenberg Jr., the second-generation president of Jefsteel. "We saw marketing opportunities out there that we were not positioned to develop. In a nutshell, business was growing faster than we could handle."

Two steps were taken. Michael Miller was hired as vice-president of the Micrographics Division, with responsibility for that line. To develop a customized minicomputer system tailored to Jefsteel's needs, Computer Assets Corp. (CAC) of Weehawken, N.J., was retained.

"For a traditional company like Jefsteel, computerization can be a frightening word," Levenberg said. "You envisage having to shift from a past way of life that has proven successful to an unknown area, where the computer dictates how you do things, rather than your own business judgment. And of course you imagine all kinds of costs eating into your profits."

The computerization project started with a detailed assessment of how computers could aid the company to handle growth and achieve its goals. There was no attempt to find a ready-made solution and then ask Jefsteel to reshape itself to fit this mold.

CAC has developed its own utility library on disk, from which it can prepare the software geared to the individual customer's requirements. So Jefsteel didn't need to purchase complete packages.

From this utility library, CAC drew the customizing features which, together with the microcomputer assembled from components produced by Digital Equipment Corp.'s OEM Products Group, yielded the system now in use at Jefsteel.

"Order entry, production scheduling, inventory control and accounts receivable are now on the system," Levenberg noted. "We will gradually move into other areas. At the present time, we are more than pleased with the tools we have gained."

Today, Jefsteel uses the customized system to plan production so that resources are meshed with production time to achieve maximum use of materials and manpower. Shop orders are issued in a sequence designed to keep orders coming off the production line in time to meet delivery schedules. Jefsteel can now tell customers when orders will be ready for shipment.

Economies in the use of materials and machines are realized by batching similar processes. All work done in a particular color is batched together, which means the color process need not be stopped and then reactivated, with the same materials being handled again and again.

According to Harman Houghton, the president of CAC, the customized system specified for Jefsteel was selected because of its flexibility and cost. "DEC's PDP-11/03L [which has 64K bytes of memory] enabled us to customize a system which, together with the resources of our software utility library, enabled Jefsteel to enhance its proven productivity without diverting from familiar procedures," he claimed.

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6. HOUSTON — Southwestern Computer Expo, Albert Thomas Convention & Exhibit Center, (713)222-3561, May 8, 9, 10
7. CHARLOTTE — Southeastern Computer Expo, Civic Center, (704)379-3600, May 15, 16, 17
8. PITTSBURGH — Northeastern Computer Expo, Greater Pittsburgh Merchandise Mart, (412)243-8716, May 22, 23, 24
9. BOSTON — New England Computer Expo, John B. Hynes Auditorium, (617)269-8000, May 29, 30, 31

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Floppy Standard In Cbema Report

WASHINGTON, D.C. — A report that explains how to meet the requirements recently adopted by the American National Standards Institute for ensuring the interchangeability of 5.25-in. floppy disk cartridges is available from the Computer and Business Equipment Manufacturers Association (Cbema).

The report discusses the physical specifications necessary for media to be interchanged with different cartridge drives.

The standard addressed to the "one-sided, single-density, unformatted 5.25-in. flexible disk cartridge" is identified as BSR X3.82. The report costs $5 prepaid with a mailing label.

Orders for the report should be sent to the Secretariat Staff, Cbema, Suite 1200, 1828 L St. N.W., Washington, D.C. 20036. Comments on the report are invited and should be sent to the same address.

Realtors Aided in Matching Property, Buyers

McLEAN, Va. — Real-time minicomputers are enabling realtors across the country to list and sell properties with greater speed by matching prospects and houses more accurately than ever before.

Multiple-listing services (MLS) agencies — local real estate exchanges — are increasingly using automated data acquisition and management because of the successes of current on-line systems.

PRC Realty Systems, a firm here that specializes in on-line systems for MLS agencies, has already installed 50 Hewlett-Packard Co. HP 1000 systems in real estate boards nationwide.

Level of Sophistication

"Real estate is a dynamic market. Like the securities market, there are hundreds of changes in what is available in real estate in a given market on a given day. PRC brings real estate up to the stock market's level of sophistication with 20th-century technology. We provide real-time information for what is essentially a real-time business," according to Bert Helfinstein, PRC's president.

PRC, which first used computerized listings in Cleveland 10 years ago, recently expanded the capabilities of its system to meet the mounting demands of the real estate business. When the original configuration proved inadequate, PRC engineers went shopping for a flexible, low-cost computer that could handle the job.

"We did a lot of serious research before deciding on a supplier," Helfinstein said. "We started with a list of 15 minicomputers, did a paper analysis of capability and cost and visited each manufacturer.

"All things considered, HP offered the most capable machine for the job. It seemed to be reliable, and we needed its microprogramming capability. Ours is a communications application, and HP computers are excellent communications processors," he added.

PRC's multiterminal processing system allows for real-time management of the essential real estate information in a particular area.

To use the system, a subscriber/agent — who has his own electronic identifying code — makes contact with the central HP 1000 via telephone. The telephone is then coupled with an office hard-copy keyboard terminal that prints at a speed of 30 char./sec.

The CPU configuration is determined by the size of the data base and the number of terminals to be accommodated. PRC employs both single- and multiple-processor configurations.

A single M30 processor with one or two Model 7905 disk storage units does the job for most MLS board offices, but the very large boards use multiple M30 processors with two or three 7906 disk storage units each.

The keyboard entry passes through a modem coupler on the computer end that demodulates the signal. A cable connects the coupler with six HP 12920B asynchronous multiplexers, each of which provides interfacing for up to 16 communications devices at rates from 57- to 2,400 bit/sec. The number of multiplexers is also dependent on the number of terminals.

Up to 96 ports can be accommodated in the PRC configuration and more can be accommodated by adding multiplexers. The multiplexers plug directly into the I/O section of the minicomputer.

Active Listings Only

The minicomputer's data bank is always current. Agents search only active listings and make use of more parameters in matching clients and properties than an individual broker could handle, according to Helfinstein.

"A PRC terminal costs roughly the same as listing books for an office of eight to 10 agents. The difference is that the minicomputer can do more — a whole lot more," he said.

When a prospective client contacts an agency, the descriptions of the house in which he lives and of his "dream house" are written on profile sheets that can accommodate up to 300 parameters.

The agent then enters the information into the system through a keyboard terminal linked by modem to the minicomputer. The mini is programmed to ask for the data from the profile sheets so that all necessary data is added to main memory. A simple command structure is employed to eliminate the need for teaching programming to agents.

The agent then uses the system to:

- Locate suitable properties from active listings.
- List the most recent comparable sales in the area in order to set the best asking price for the client's house.
- Identify prospects by name for the client's property.
- Compute how much the client can afford for a new home and the amount of the loan he can obtain.

When a match is found, it is as exact as possible, which reduces time wasted on futile visits and bolsters customer confidence in the agent.

Computerization has also been used to expand clientele. "For sale by owner" homes are being drawn into the MLS agencies' listings in increasing numbers. Sellers are said to be more open to the thought of using real estate agencies when they are offered computerized lists of prospects.

For clients seeking investment property, the system analyzes and prints out a property's investment potential, projected operating costs and rate of return.



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In Kimball Union's Dormitory

Terminal Eliminates Need to 'Crack the Books'

By Marguerite Zientara
CW Staff

MERIDEN, N.H. — There was a time when students "cracked the books" late into the night, but no longer, at least not at Kimball Union Academy, a private secondary school here that recently installed a minicomputer-based terminal in a student dormitory.

Students can use the Digital Equipment Corp. VT 52 Decscope terminal around the clock as an instructional aid in Latin, English and the sciences, according to Paul Sheff, director of admissions at the 225-student school.

And apparently they do. "We've already gone into our second purchase of memory, and we need to purchase still more," Sheff said.

Kimball Union's use of computing as an instructional tool began 10 years ago with the acquisition of a DEC PDP-8 CPU and three terminals. The equipment was used mostly for administrative work, but also to help teach students about computing, Sheff stated.

Firsthand Knowledge

One of Kimball's teachers left the school to teach at DEC and returned a few years later with firsthand knowledge of the vendor's latest equipment, Sheff recalled. "Our equipment was getting old, and we wanted to revise it. Since one of our good friends had been a founder of DEC, and since we had on-site a former DEC instructor, we got involved in a rather big way," he explained.

In June 1978, the school acquired a PDP-11/34 minicomputer with 96K bytes of memory as well as five Decscope CRT terminals, one with a viewing screen for graphics displays of mathematical functions.

It also acquired two 180 char./sec Decprinters for grade printouts, class rosters, payroll data, mailing labels and alumni and admisssions data. In addition, of two 300 bit/sec Decwriter terminals that provide hard copy, one is used jointly by the physics and chemistry departments, and the other is for general use.

Teachers Write Software

Although language teachers at the school wondered whether they could really use the computer in their teaching, eventually "we came to understand how one could write programs to teach English grammar and Latin declensions and inflections," Scheff said. With minimal instruction from on-campus teachers who knew the DEC system, teachers of English, Latin, science and math began to write their own software.

It is too early to tell whether the scholastic performance of students who use the system at Kimball Union has improved. However, Sheff noted, "I do know that kids who normally think declensions are pretty dull think nothing at all of doing the drills at the terminal.

Basic-Plus is the language most often used by the students to work out problems in math, physics and chemistry. It is also used to process administrative, alumni and admissions data, Sheff said. Fortran IV is used in some scientific studies.

Using DEC's Author Language (Decal), teachers with virtually no computing background have created software for learning Latin declensions and vocabulary, for verbal and mathematical review lessons as part of college board preparation, for laboratory experimental analysis in physics, chemistry and biology and for teaching concepts in mathematical probability.

In addition to instructional programs, the computer stores games of chance and logic that help develop reasoning abilities and stimulate student interest in the computer's other services.

"Other people, I think, see the computer as an educational intrusion and in some ways as gimmickry or a shortcut," Sheff said. "But actually it has freed our instructors to do more work; what once took an administrator two weeks now takes four hours."

Power Mounted on Cards

PHOENIX — A series of card-mounted ac/dc power supplies for minicomputers is available from B Industries, Inc.

The Mini Power Supplies (MPS) accept 115 Vac input in the 50 Hz to 400 Hz range; they are available in single, dual and triple output models.

The MPS are intended to support such units as CRT terminals, linear integrated circuits, reed relays, logic supplies, transducer excitation modules, static shift registers, read-only memories, random-access memories, digital-to-analog and analog-to-digital converters and process controllers, the vendor said.

The MPS models cost between $29 and $80 each. B Industries is at 3402 W. Weldon Ave., Phoenix, Ariz. 85017.

Printers Fit Burroughs Units

FORT LAUDERDALE, Fla. — Southern Systems, Inc. has announced a plug-compatible printer family for low-end Burroughs Corp. processors.

Southern Systems' B-2200 series printer family uses a newly developed integral printer interfacing and outputs 200- to 900 line/min, the firm noted.

The B2200 is compatible with the Burroughs B80, B700, B800, B1700 and B1800 processors.

Prices range from $5,000 for the 200 line/min version to $16,000 for the 900 line/min printer. Deliveries are under way.

Southern Systems is located at 3000 N.E. 30th Place, Fort Lauderdale, Fla. 33306.

Diskette Holder Stores, Retrieves

NEW YORK — A diskette storage and retrieval system that reportedly features diskette retrieval "at the push of a button" has been announced by Printcraft Systems, Inc.

The system helps keep diskettes neat, clean and away from office hazards, according to the firm. It is made of high-impact plastic and is portable and stackable.

Available in three sizes, the 15-slot storage unit costs $69.95; the 30-slot unit is $119.95; and the 50-slot system is $179.95. Printcraft is located at 11-17 Beach St., New York, N.Y. 10013.

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You'll say good-bye too when you compare INTERTUBE's price / performance ratio with any other terminal on the market today. Standard INTERTUBE features include: a 12" display in a 24 line by 80 column format, 128 upper and lower case ASCII characters, reverse video, blinking, complete cursor addressing and control, an 18 key numeric keypad, separate backspace, tab, shiftlock, local, on-line and print keys, special user-defined function keys, protected and unprotected fields, line insert/delete and character insert/delete editing, eleven special line drawing symbols, 15 selectable baud rates from 75 to 9600 BPS, half and full duplex operation, an RS-232 interface, and ... would you believe it ... there is more! A special "Status Protect" key allows you to enable only those features required in your system and "lock-out" all others, thereby assuring flexible operation in both "smart" and "dumb" environments.

By now you're probably becoming very uneasy if your last terminal purchase wasn't an INTERTUBE. Brace yourself. You're going to become sick! OEM's realize there are no hidden costs of ownership with the INTERTUBE. You can have all the performance you need without having to add expensive options. Standard user-oriented features are: an RS-232 printer port, "block" transmission modes, parity and baud rate error detection, a self-test mode, a 25th "STATUS" Line which displays the current status of the terminal, a transparent mode to simplify program debugging, and selectable display intensities for "easy-on-the-eyes" operation with minimized operator fatigue.

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The basic system consists of the CPU, 20 megabytes of cartridge disc storage, a doublesided flexible disc with a one megabyte capacity, and a microprocessor-based console that doubles as a service 'window' on the system. Plug in a self-test cartridge and it runs a diagnostic check in less than two minutes. (It can even be run remotely via a modem.)



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LSV-1	600 x 800	1000	16 mm
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LSP-26F	800 x 1000	1400	26 mm
LSV-2W	1400 x 1800	2200	35 mm

SIERRA SCIENTIFIC CORPORATION

Review Manual Operation Before Buying First System

By Leonard F. Turi
Special to CW

Contrary to what is proclaimed in most advertisements for small computer systems, the user shouldn't expect to just plug in the CPU and have it automatically start solving his business needs. In fact, some firms encounter great problems when they automate for the first time.

Before a small business can clearly evaluate the usefulness of a computer system, it generally needs to review its everyday business functions to determine if there is a better way to perform them manually. In other words, a small business concern should first systematize its manual business functions.

By systematizing, the small business manager will have a more complete understanding of his company. In the event the decision is made to automate, the computer system selected can be used to implement the proper methods for doing business.

Evaluation Necessary

Generally, most small firms expect a CPU to help them stop a profit drain imposed by rising operating costs and the inefficiency of existing methodologies. The system is expected to provide quicker cash flow with no delays in billing or management reporting, eliminate billing and pricing errors, reduce paperwork costs, enhance controls and yield more timely information to managers.

The following evaluation procedure is suggested for small businesses considering the purchase of a computer system:

1. Define the firm's short- and long-range business functions.
2. Compose a business functions flowchart.
3. Perform an information analysis, defining management and operations requirements for business data and systems implementation.
4. Prepare a data and operations requirements chart.
5. Identify areas where the use of a small business computer system would be profitable.
6. Match the firm's needs with the performance offered by available systems to assess their applicability, cost benefits and limitations.

Each step is important and cannot be omitted or slighted. Steps five and six require knowledge of current operating costs as well as cost projections for hardware, software installations, training, maintenance and development of each candidate system.

The user should be realistic in estimating potential cost improvements and their probable impact on profits. The CPU's internal speed and storage capacity should not be the only factors in selection. The focus should be on how the system might increase profits.

Turi is president of Technical Marketing Services, Inc., a New York-based consulting and marketing firm.

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Compact Flexible Disk Offers DEC Compatibility

SANTA CLARA, Calif. — A double-density flexible disk memory system from Data Systems Design, Inc. (DSD) reportedly allows Digital Equipment Corp. users to record data in either DEC double-density or IBM 3740 single-density formats.

The DSD 440 disk system is also said to provide software and diagnostic compatibility with the DEC RX02 disk system and to require only half as much rack space as the RX02 while offering the same storage capacity.

Packaged in a 5.25-in. chassis, the system is "particularly useful in applications where rack space is at a premium," according to a spokesman.

The DSD 440 is available with interfaces to DEC PDP-8 and PDP-11 minicomputers and LSI-11 microcomputers. The latter two interfaces contain a 512-word bootstrap program that executes diagnostics on the interface, controller and processor memory.

Four Slots

A complete LSI-11 system, including bootstrap, can be configured in only four Q-bus slots, he added.

The DSD 440 offers stand-alone diagnostics for the controller and drive assembly that execute independently of the CP.

A dual-drive DSD 440 disk system costs $3,695; OEM quantity discounts are available, DSD said from 3130 Coronado Drive, Santa Clara, Calif. 95051.

Controller Suits DEC Users

CANTON, Mass. — A compact moving-head disk cartridge controller for Digital Equipment Corp. LSI-11 and PDP-11/03 computers that reportedly operates with DEC, Pertec Corp., Diablo Systems, Inc. and similar drives has been introduced by Gen/Comp, Inc.

The Model 2152 disk cartridge control is a single quad-height, four-layer printed circuit board that provides 2.5M- to 20M byte of storage, according to the firm. Transparent to the DEC RT-11 and RSX-11S operating sytsems, the microprocessor-controlled Model 2152 reportedly is media-compatible with RKV11 and RK05 disk drives.

Accommodating 100- or 200 track/-in. densities, the Model 2152 is said to control up to four 1,300 rpm drives and to require a single +5 Vdc power supply. The board performs the basic control and sequencing of data transfers between a microcomputer and disk drive, the firm said, and mounts into any available quad LSI-11 Q-bus slot.

The Gen/Comp Model 2152 disk cartridge control costs $1,500, including disk drive cable. Gen/Comp is at 6 Algonquin Road, Canton, Mass. 02021.

With Development System

Colorado Students Automate Disco

By Ann Dooley
CW Staff

BOULDER, Colo. — Students at the University of Colorado here are learning to groove to disco music, sing along to "Jingle Bells" and program read-only memory (ROM), all by using a microprocessor development system.

Although Beethoven and floppy disk systems usually don't have much in common, the system permits students to work on a variety of projects ranging from the development of a unit for programming memory to the design of a music synthesizer.

The Tektronix, Inc. 8002 Microprocessor Development Lab (MDL) forms the backbone of a course on computers taught in the University's Electrical Engineering Department. The system's significant feature is its removable floppy disk storage system, which is large enough to store a variety of work and data, according to Paul Williams, a design engineer and instructor for the course.

Floppy disk storage enables large numbers of students and faculty members to use the system without affecting each others work, he noted.

Two-Part Course

The course itself is divided into two sections, a lecture on the theory of microprocessors and a lab during which students execute their design projects. Two students work on a single project and use the MDL to develop and design the hardware and software for their project.

A stand-alone system, the MDL includes a facility for testing microprocessor-based hardware under development and is perfect for students experimenting with new concepts and techniques, Williams said.

The MDL is adaptable to the Intel Corp. 8080, 8080A and 8085A, the Motorola Semiconductor Products, Inc. 6800, the Zilog, Inc. Z80 and the Texas Instrument, Inc. TMS 9900 microprocessors.

Another feature which instructor Williams and the students find invaluable is the hardware emulator incorporated into the system. "Without it, just getting finished projects to run properly would be a full-time project for any of the students," Williams pointed out.

Six Design Projects

A total of six design projects have been undertaken by the students since the system's arrival. The projects and problems confronted are "true-to-life" and several came as a result of requests from companies in the area.

One project was initiated when a local computer equipment company asked for an MDL with the capability to "burn," or imprint, programs on a particular type of memory circuit, the 8755 programmable read-only memory (Prom) from Intel Corp. The students successfully designed a device to program the 8755, beating Tektronix engineers who had also been working on the problem

Other projects included an intelligent terminal, a microcomputer-based circuit board tester and a video switcher unit.

One student was offered a job at Bell Laboratories after he designed a telephone display system that permits a caller to view the numbers dialed over a period of time and the cost of the calls.

The student response to the MDL has been very positive, according to Williams. "They are doing more projects than ever before, they are doing them more efficiently and they are progressing faster in their knowledge about microprocessors, too," he noted.

Students are much more eager to experiment and work since they can see the actual working model once it is completed. The hands-on learning is really beneficial, he said, adding that "it fits the bill perfectly for teaching students about computers."

"One student was offered a job at Bell Laboratories after he designed a telephone display system that permits a caller to view the numbers dialed over a period of time and the cost of the calls."

Apple Users Offered Accounting, Payroll Aid

LOS ANGELES — Charles Mann & Associates has added Payroll I, Paycheck I and Payrecord I to its line of software for Apple Computer, Inc. Apple II microcomputers.

All of the software was designed to operate on a single Apple II disk with 32K bytes of random-access memory (RAM). The packages will run weekly, biweekly, semimonthly and monthly payrolls or any combinations of these, the firm said.

The latest federal regulations are incorporated, and each system can provide data for state and federal reports, a spokesman noted.

Payroll I and Payrecord I allow for the optional use of a printer. Payroll I is a single-purpose system; Payrecord I is a modular addition to the firm's one-type accounting system and provides for posting of payroll data to the cost accounting system.

The Paycheck I system, in addition to posting to the firm's Print Check Accounting System I, allows for the printing of paychecks on many impact printers.

Other offerings include the Personal Accounting System, which was designed to maximize tax deductions.

Prices for the software range from $19.95 to $139.95; the packages are available from about 200 local dealers. More information is available from Charles Mann & Associates' Micro Software Division, 1926 S. Veteran Ave., Los Angeles, Calif. 90025.

Superchip for Apple Micro Enhances Text Processing

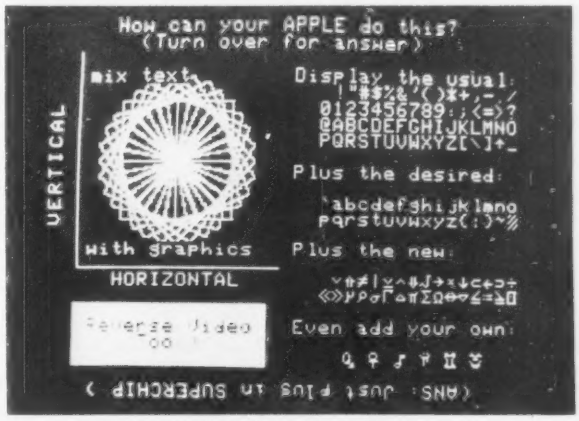
DALLAS — The Superchip is a read-only memory firmware chip that enhances the text processing capabilities of Apple Computer, Inc.'s Apple Microcomputer, according to its vendor, Eclectic Corp.

The chip plugs into the Apple system without modification and adds the full Ascii character set as well as 31 non-Ascii characters, the firm said.

The chip also enhances editing capabilities for program and data modification and is compatible with existing Apple programs such as Interger Basic and Applesoft.

Used in conjunction with a character edit cassette, new characters can be defined in a magnified format, the firm said. This allows a user to create character sets such as foreign alphabets, musical notes and game pieces.

The Superchip costs $99.95 and the character edit cassette costs $24.95 plus shipping charges from Eclectic Corp., 2830 Walnut Hill Lane, Dallas, Texas 75229.



Eclectic Corp. Superchip

Steering Committee Named For Festival at June NCC

MONTVALE, N.J. — Richard A. Kuzmack, chairman of the Personal Computing Festival of the 1979 National Computer Conference, has selected his steering committee.

It includes Jay P. Lucas and Russell E. Adams, both of the U.S. Patent and Trademark Office, who will serve as program co-chairmen; and Edward J. Fox of the Department of Defense's Fort Meade, Md., installation and Joe Kasser of Comsat Labs, in Silver Spring, Md., who will serve as demonstrations co-chairmen.

Harrier Shair of The Computer Corner, White Plains, N.Y., will serve as operations chairwoman and Charles Floto of Phillips Publishing, Inc. in Washington, D.C., will be publicity-publications chairman.

The festival will be held June 4-7 in New York in conjunction with NCC.

Kuzmack is a senior economist with the Mathtech Division of Mathematica, Inc. in Arlington, Va. Burchenal Green, managing editor of *Creative Computing Magazine* in Morristown, N.J., is vice-chairwoman.

More information on the Personal Computing Festival can be obtained from the NCC sponsor, the American Federation of Information Processing Societies, 210 Summit Ave., Montvale, N.J. 07645.

For Ohio Scientific Users

Cassette Offers Four Games

MORRISTOWN, N.J. — A cassette tape of games is now being offered by Creative Computing Software for the Ohio Scientific Instruments, Inc. Superboard II/Challenger 1P.

The games include Dodgem, a game for one or two players which uses strategy to get pieces off the opposite side of the board; and Tank Attack, a game for one player whose object is to seek and destroy enemy guns hidden among houses and trees.

Also included are Free-For-All, in which an airplane, destroyer and submarine vie for each other; and Hidden Maze, in which the object is to find the way through an invisible maze with one-way gates.

The catalog number of the tape cassette is CS-6001. It costs $7.95 plus 75 cents postage from Creative Computing Software, P.O. Box 789-M, Morristown, N.J. 07960.

Journal Devoted to TRS-80

TACOMA, Wash. — Radio Shack Corp. TRS-80 users can now take advantage of a magazine devoted entirely to the TRS-80 called the *80-Northwest Journal* (soon to be called *80-U.S. Journal*).

The journal features complete Basic and machine language program listings and covers all TRS-80 capabilities. It includes articles on business, audio-visual, science and games.

The *80-Northwest Journal* is published bimonthly.

A one-year subscription costs $16 from 80-Northwest Publishing, P.O. Box 7112, Tacoma, Wash. 98407.

Wintek Slates Workshops

LAFAYETTE, Ind. — Wintek Corp. has scheduled Spring '79, a series of hands-on microprocessor workshops. Each workshop will include a three-day introduction to microprocessor hardware, software and economics followed by a two-day workshop on interfacing micros to the real world.

Each student will receive a Wintek Wince single-board computer to use in the workshop and then take home, the firm said.

Tuition is $499 for three days and $699 for five days. The workshops will be held in Atlanta, Ga., starting March 5; Lafayette, Ind., starting March 19; Los Angeles, April 2; Boston, May 7; and New York, starting June 11.

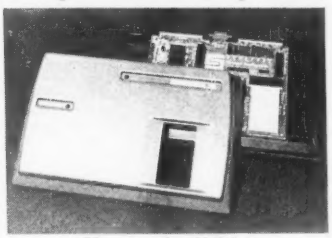
More information is available from Wintek, 902 N. 9th St., Lafayette, Ind. 47904.

Housing Ready For SYM-1

SAN FRANCISCO — Users of Synertek Systems' SYM-1 can now utilize a housing unit for their systems from the Enclosures Group.

Called the SSE 1-1, the housing unit has room for a power supply and additional circuit boards. It is thermoformed for durability and safety, the firm said.

All mounting hardware is provided for the SYM-1, which attaches to the housing liner in minutes, a spokesman said. The cover can be removed easily if necessary, he added.



Housing for SYM-1

Available in "data blue," the SSE 1-1 costs $36.75 from the Enclosures Group, 753 Bush St., San Francisco, Calif. 94108.

Book Contains 101 MPU Games

NEW YORK — *Basic Computer Games* is a collection of 101 games for microcomputers written by computer buffs from all over the country.

Available in bookstores, the book is a major revision of David Ahl's *101 Basic Computer Games*, a 1973 book for large systems. The programs have been rewritten for home use.

Instructions are included for adapting the programs to variant languages.

The book costs $7.50 and is published by Workman Publishing, 1 W. 39th St., New York, N.Y. 10018.

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2. CHICAGO — Midwestern Computer Expo, McCormick Place, (312)791-6000, March 27, 28, 29
3. ST. PAUL — Twin Cities Computer Expo, Civic Center, (612)224-7361, April 3, 4, 5
4. SAN FRANCISCO — Northwest Computer Expo, Civic Auditorium, (415)558-5065, April 17, 18, 19
5. LOS ANGELES — Southern California Computer Expo, Los Angeles Convention Center, (213)741-1151, April 24, 25, 26
6. HOUSTON — Southwestern Computer Expo, Albert Thomas Convention & Exhibit Center, (713)222-3561, May 8, 9, 10
7. CHARLOTTE — Southeastern Computer Expo, Civic Center, (704)379-3600, May 15, 16, 17
8. PITTSBURGH — Northeastern Computer Expo, Greater Pittsburgh Merchandise Mart, (419)243-8716, May 22, 23, 24
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First Acquisition Move

Amdahl Bids Against NCR for Comten

By Marcia Blumenthal
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. caught acquisition fever recently, offering to merge with Comten, Inc. on a share exchange basis. The offer is the first Amdahl has made to acquire another company.

NCR Corp. made a cash tender offer of $22 per share to the data communications firm about two weeks ago. NCR's offer also included a stock transfer option.

Although Amdahl's offer translates to a cash equivalent of about $26 per share, the decision won't be an easy one for Comten to make, according to Howard Stenzel, Comten's vice-president of finance, secretary and treasurer.

The more volatile nature of Amdahl's stock compared with NCR's and the different structures of the offers — cash vs. stock transfer — are the two major factors complicating the evaluation, according to Comten and industry analysts.

"The catch [with Amdahl's offer] is that the final offer is to be determined at some future date, probably in April or May, so we won't know what the value of Amdahl's stock will be [then]," Stenzel said. A critical question facing Comten is "does Amdahl's stock have such volatility that even though perceived [to be valued at] $26 per share, can you see $26 there?"

Comparing two cash offers is easy, but "stock in terms of its value and its future in the company you are being merged into is something else to evaluate," Stenzel reasoned. Amdahl offered Comten shareholders .5 to .6 share of Amdahl for each Comten share.

'Comten is a software and systems company positioned in the fastest growing sector of the industry — networks. The market is not going to be computers, so it solves a big problem for Amdahl.'

— William Becklean, Vice-President
Bache, Halsey Stuart Shields, Inc.

Aside from the financial evaluation, Comten must assess the "technical fit" of the two bidders, Stenzel added. In terms of technical fit with Comten, "both companies are attractive but not equal," he said, but declined to elaborate.

The "synergism" between the two companies was a factor in Amdahl's decision to make an offer, an Amdahl spokesman said. "Comten makes a communications processor compatible with [the needs of] our user base," he said, adding that both companies have a similar user base.

Amdahl's current lack of capability to provide a system approach for customers has been cited by industry sources as a weakness in the company. The Amdahl spokesman

(Continued on Page 58)

Federal Intervention Advised To Spur Industrial Innovation

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Carter Administration may have gotten more than it bargained for when it asked for suggestions on how federal policies might be changed to spur industrial innovation in the U.S.

The recommendations called for just about every kind of government intervention in the U.S. economy imaginable through all manner of oversight committees, blue ribbon commissions and special programs.

The suggestions were put together by several advisory committees comprised of senior executives from industry and representatives of labor, public interest groups and academia. The committees are part of the government's "Domestic Policy Review of Industrial Innovation," currently the topic of a series of two weeks of symposia being held here on such subjects as government procurement, economic and trade policy, patent policy and support of research and development.

The symposia will result in a report that will serve as the basis for recommendations to be made to The President by March 30 by a task force representing approximately 30 federal agencies, according to Dr. Jordan J. Baruch, assistant secretary of Commerce for Science and Technology, who is chairing the meetings.

Calling the first symposium to order Jan. 15, Baruch said the meetings are being held "to address the question of how federal policy can enhance the process of industrial innovation in the U.S." because The President

(Continued on Page 63)

Denies Difficulties

Citel to Emphasize 4300 Series

By Marcia Blumenthal
CW Staff

ORANGE, Calif. — Citel Corp. is holding off the production of its models 3 and 4, Larry Taylor, chairman, said before the announcement last week of IBM's 4300 series, which had been expected as the E series.

Citel announced its models 3 and 4 last year. The mainframes are plug-compatible replacements for the IBM 370/138 and 370/148, respectively [CW, Oct. 23].

Citel is now emphasizing its Model 5, an IBM 3031 replacement. "When we do produce the models 3 and 4, they will be targeted against E series machines instead of 138s and 148s," Taylor remarked. Potential customers for 138 and 148 replacements are currently not buying, he claimed.

In a recent telephone interview, Taylor explained the redirection of product emphasis and the company's reorganization, denying that those moves signal serious marketing or financial problems for the fledgling firm.

Donald R. Wilshe, previously Citel's president, is now vice-president of planning. Wilshe was spending most of his time on marketing activities rather than on overall corporate direction, so it made sense to realign his position, Taylor said.

Winston Hodge, formerly vice-president of engineering, has replaced Wilshe as presi-

(Continued on Page 61)

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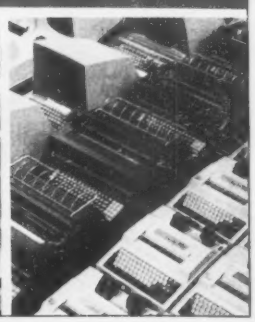
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Now Memorex Vice-President

Smith: Industry Has Renewed Verve

By Marcia Blumenthal
CW Staff

SANTA CLARA, Calif. — If it hadn't been for semiconductor and microprocessor technology, Gordon Smith, newly appointed vice-president of marketing at Memorex Corp. and a computer industry veteran, would have been looking for new horizons in another industry.

Smith, who was present at the first public demonstration of Eniac, thinks the industry is now much like the way it was in its early days.

In a recent interview here, Smith described the 10 years between 1954 and 1964 as a time when "we knew we had something that would change the world." Later, as the industry concentrated on making the computer faster and faster, it lost its original verve; the product became a commodity, not an ingenious use of technology, Smith said.

Today, Smith thinks, that ingenious spirit is back.

Prior to Smith's taking over Memorex' corporate marketing leadership, the position was unfilled for about a year. Memorex was in the process of decentralizing and the overall corporate marketing function was less important, he explained.

With Memorex's decentralization effort just about complete, Smith thinks the time is ripe to begin giving an overall strategic direction to Memorex's marketing effort.

Smith, like others in the industry, has recognized that Data Processing equipment has become more than a commodity. Ingenious uses of technology that make the equipment easier and more efficient for the user to operate will allow companies to distinguish themselves in the gigantic marketplace.



Gordon Smith

For instance, Smith pointed to a Memorex product using microprocessor technology on a tape drive which stamps a mark on the tape when it is beginning to wear out as "ingenuity, not just technology."

Merchandising occurs when "you take a relatively stable product line, in a marketing sense, and apply experience in technology to add value to the product," Smith maintained during his discussions with Robert C. Wilson, chairman and president of Memorex, prior to accepting the position. Smith said he was convinced that Memorex was approaching its products ingeniously.

Singer: Wrong Approach

Wilson, in turn, was impressed with Smith's international marketing expertise. This experience included responsibility for Univac's operations in Europe, Africa and the Middle East as executive vice-president and as vice-president and general manager of Singer Business Machines International.

Reflecting on his experience with Singer between 1972 and 1976, Smith concluded that Singer approached the domestic market incorrectly. Singer was looking for market share and "agreed to service its products at some ridiculously low price," Smith recalled.

But the international sector of Singer's business, for which Smith was primarily responsible, was profitable and "later sold to ICL", Smith noted, emphasizing one of his cardinal rules. "I insist on being on a winning team," he said with a big grin.

IBM Not a Threat

Apparently Smith considers Memorex a winner. The sales and service aspects are all in place, Smith said.

Threats from IBM's recent aggressive moves in the marketplace don't bother Smith. "It s not like we are suddenly competing with IBM," he pointed out.

In his role as overall strategic impresario, Smith expects to develop a more recognizable corporate image for Memorex. During part of his 18 years with IBM, Smith was responsible for developing the IBM corporate image and design program.

In discussing corporate image, Smith expressed annoyance at the image the financial community created for Memorex which, in part, was responsible for the plunge in the price of the company's stock in October after third-quarter earnings were announced [CW, Nov. 6].

Different Image

Users of Memorex products have a totally different image, he continued, thumbing through a recently published survey by *Datamation* in which users rated Memorex second only to IBM for most disk products.

"Memorex has been responsive to the end user rather than the financial community," Smith said. He hinted that a reconciling of the two images would be a priority.

In addition to working on corporate image, Smith intends to put more emphasis on industry-specific marketing along the lines of Memorex's current approach to the airlines industry with its disk drive products.

While congratulating IBM on its strategy of convincing users they don't need a second supplier, a violation of a prime business rule, Smith said he would stress making Memorex the major second source for users currently purchasing IBM products.

Besides executive positions with Univac, IBM and Singer, Smith, an economist by training rather than a technical expert, most recently was senior vice-president of marketing at Information Sciences Corp., a specialized software firm.

Amdahl Bids for Comten

(Continued from Page 57)

agreed that Amdahl needs a more systems-oriented, value-added approach.

In trying to make the changeover to providing systems rather than just hardware, Amdahl has been analyzing various companies for possible acquisition, the spokesman noted. He hinted that Amdahl would woo other companies in the not-too-distant future.

Guarded Response

As expected, NCR's response to Amdahl's offer was guarded. "The two offers are structured differently," according to Donald L. McIntosh, senior vice-president of finance at NCR. "Ours is a cash tender offer on known value today."

McIntosh said he could not comment in any further detail on the Amdahl offer or on whether NCR would raise the price of its offer.

Computer industry analysts were not quite so reticent about commenting on the two offers. Comten would be a very attractive acquisition for Amdahl, according to William Becklean, vice-president of Bache Halsey Stuart Shields, Inc.

"Comten is a software and systems company positioned in the fastest growing sector of the industry — networks. The market is not going to be computers, so it solves a big problem for Amdahl," Becklean said.

Both NCR and Amdahl need Comten's capability, Becklean continued, adding that it probably is more important for Amdahl to win the bid.

Looking at the two offers from a Comten shareholder's perspective, Becklean said, "If you take Amdahl stock and sell it, it's taxable. But if you don't want to take a capital gain this year, then you'd like to feel you are holding a piece of paper worth holding."

Both companies are financially and technically solid, "but Amdahl is a little more speculative," Becklean said.

Like Becklean, Vincent Turzo, senior analyst with Oppenheimer & Co., Inc., thinks the acquisition is particularly important to Amdahl. "Comten is strong in software and knows how to function in an [IBM Systems Network Architecture] environment. Amdahl will have to get more involved in communications software to maintain growth," Turzo said.

Although Comten professed not to be seeking to be acquired, Turzo speculated that "with a big brother, Comten could more aggressively pursue its business."

While the financial and technological issues appeared to be evident to the executives involved in the merger as well as industry analysts, the possibility of a bidding war was not clear. Amdahl did not expect a bid off with NCR.

"NCR may figure its offer at $22 a share is worth Amdahl's offer of $26 a share," Becklean pointed out.

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Shell was also interested in updating their on-line invoicing system. The 820, with its high-speed transmission and quality impact printing, has been serving Shell's needs with clear, legible originals and multiple copies.

TI's 820 is also capable of going to work at Shell's refineries, well sites, even offshore rigs, to augment their production support system.

The versatile 820 KSR is serving in more than the oil field. Industries like banking, accounting and communications are calling on it for remote data applications and distributed networks.

Producing quality, innovative products like the 820 KSR impact terminal is what TI is dedicated to. And TI's over 200,000 data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

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If you would like more information on the Model 820 KSR impact terminal, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

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To Reflect Expanding Interests

American Used Changes Name, Reorganizes

By Marcy Rosenberg
CW Staff

BOSTON — Is it just an "11-year-itch" that makes a company take a new name, add two divisions and reorganize its management structure?

Not in the case of American Used Computer Corp., an 11-year-old computer dealer and lessor that recently changed its name to American Computer Group to more accurately reflect internal changes and expanding business opportunities.

The firm no longer wants its name linked solely with the used computer business and is branching into new areas both within and outside the computer industry. For example, the Computer Systems Division will carry hardware and software packages for the small business sector, replacing the company's Computer Warehouse Store Division.The firm started the warehouse store two and a half years ago as a venture into the hobby microcomputer market.

"We're liquidating that division because the economics of distributing personal computers through independent suppliers is not there," according to Adolf (Sonny) Monosson, American's chief executive and chairman.

"You can buy a personal computer from Radio Shack, J.C. Penney and Montgomery Ward & Co. Tandy Corp. alone has 6,000 stores," Monosson said, adding that his firm could not "compete with mass distribution operations like those that know how to retail merchandise."

Monosson also cited the declining prices of personal computers: "We could spend an hour on a $200 sale and get a gross profit of $20. That's not making a living."

'Ten-Year Clearance Sale'

American is depending on "a fantastic 10-year clearance sale" to divest the retail store of its inventory, William 3. Grinker, the firm's president, said.

On row upon row of shelves in the store front computer mart sit such bargains as $795 Hazeltine Corp. 1000 CRT terminals selling for $345 used or $595 new with 30-day warranties. Other wares include Applied Digital Data Systems, Inc. 840 console terminals for $250 and Infoton, Inc. Vista 1-H terminals priced at $295.

"We're leaving the hobby computer business with a profitable record behind us," Grinker maintained. Personal computer sales increased 35% from the first to second sales year and another 50% in the first half of the third — and final — sales year.

"Profits went up, too," he added, but declined to give earnings figures.

After American washes its hands of personal computers for the hobbyist, it plans to dip them into supportable hardware and specialized software for small businesses through the Computer Systems Division.

This division will operate from the warehouse store location as a "storefront systems house," Grinker said. Initially, the division will offer Datapoint Corp. 1500 and Digital Equipment Corp. Programmable Data Terminal (PDT) 100 hardware. It will later add the DEC 1800 and possibly Wang Laboratories, Inc. systems. First deliveries are expected to start "in a month or two," he added.

Through the Computer Systems Division, the firm will also provide general ledger, accounts receivable and general inventory applications packages, but intends to base its business on nonstandard applications software, according to Monosson, who would not give examples of planned offerings in that area.

"We'll repackage software that we've developed, and we'll also buy outside software and package it with low-cost systems," he noted. He emphasized that the division will carry only the hardware and software of national manufacturers "that have field service organizations and can provide software support."

American's aim is to provide totally self-contained answers to customers that they can accommodate as presented," Grinker added. "We don't feel it's appropriate for us to be systematizing answers for customers."

Hardware and software are going to be indistinguishable "and, in fact, software will shortly become hardware," Monosson predicted. "Instead of buying a program on disk, tape or cards, you will buy a chip, plug it in and it will do accounts receivable. All logic will be embodied on a chip."

In addition to computer leasing and trading, American plans to expand into capital equipment outside the computer area, such as medical, scientific and aircraft systems. "We're looking at any high-technology, high-dollar items that inflation will make more expensive over time," Monosson said.

"Computers are the only counterinflationary pieces of capital equipment in the world," he explained. "The price keeps coming down — in terms of price/performance and power — even though the cost of labor and raw materials keeps going up. I don't see any end in sight to that trend."

What this trend means is that "you can't assume a high residual on computer systems," Monosson noted. "There are a lot more IBM 370s that carry a higher book value than market value and, because of that, lessors will have to write off more equipment and take capital losses."

"If we're going to grow, we have to look into allied equipment areas," he maintained.

Major Management Shuffle

Both Monosson and Grinker are part of a major management shuffle at American. Monosson was named chairman and continues as chief executive.

Grinker, former executive vice-president of American Used Computer, was promoted to company president under its new name. In addition, he will serve as the president of the new Used Computer Division. In that capacity, he plans to develop large systems brokerage in the IBM 370/158, 370/168 and Series 30 range.

In addition, Joel M. Rosenfeld — a former vice-president at American Biltrite, Inc. — joined American Computer Group as executive vice-president and chief operating officer. He will assume Monosson's former administrative and financial responsibilities as well as marketing duties that were handled by Grinker.

Milford Leavy, a vice-president in charge of DEC sales, was promoted to senior vice-president to develop trading activities in the Decsystem-10, 20 and PDP-11/70 lines and, later, the DEC KI10 and KL10.

Irwin Stein was promoted from salesman to vice-president in charge of Honeywell, Inc., Univac and Burroughs Corp. equipment, and will concentrate on trading the newer Honeywell 6000 series.

"The market for used computers continues to expand as a result of available supply, and our business is expanding along with it into large-scale IBM peripherals and CPUs," Grinker said. "In 1979, there should be more than 3,000 IBM 370s that will move as a result of displacement by the Series 30.

"It's like a domino theory. A 3033 goes in, two 158s come out. Two 158s go in and replace four or five 135s, and so on down the line."

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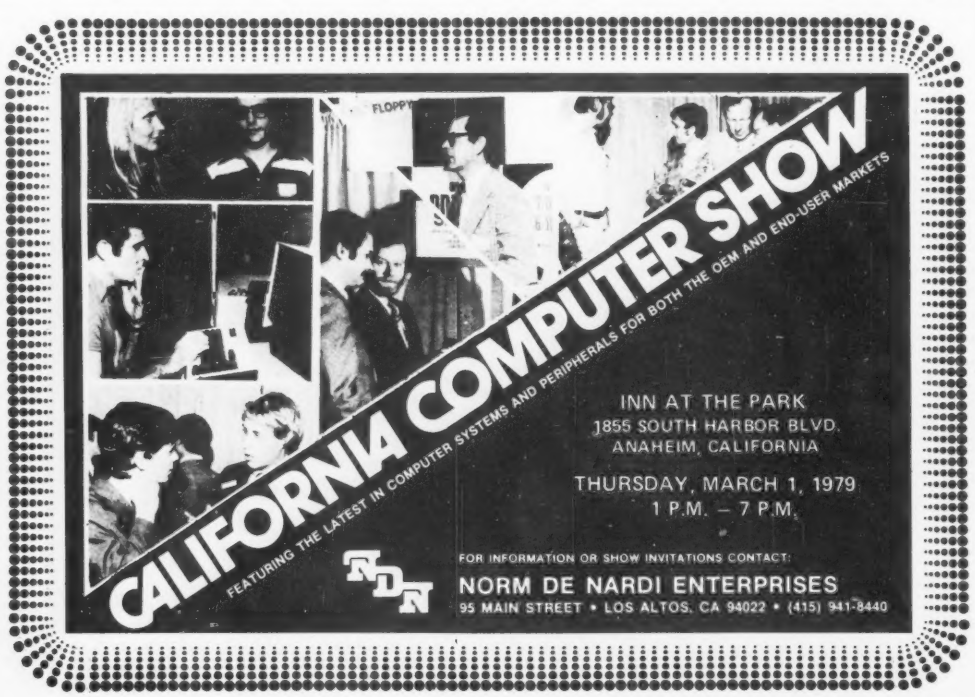
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National Semi Puts Heikes in Charge of Europe

SANTA CLARA, Calif. — Dr. Robert Heikes has joined National Semiconductor Corp. in a newly created position responsible for all the company's business in Europe and Latin America.

Heikes, most recently assistant general manager for Motorola, Inc.'s Semiconductor Group, will be based in Europe and will report directly to National Semi President Charles Sporck.

In making the appointment, Sporck emphasized, "We're seriously dedicated to the engineering, production and service needs of the foreign market and are continually building up our efforts worldwide, particularly in Europe."

A graduate of MIT and the University of Chicago, Heikes holds a Ph.D. in physics and is known for his patented work in magnetism.

Citel to Stress 4300 Series

(Continued from Page 57)

dent. Taylor's position remains unchanged.

Coincidental with the reorganization, Citel relocated its corporate offices from Northridge to Orange. The plug-compatible maker had previously been housed at Instrument Technology Systems, Inc. (ITS), which was to serve as Citel's manufacturing arm.

Taylor suspects rumors of problems within Citel got started when the deal with ITS went sour. "Problems of a legal-financial nature arose which made it impractical to continue that relationship," he remarked without disclosing further details.

Citel is now housed at the same location as Hodge, Taylor Ampersand & Associates, Inc. (HTA), which owns 50% of Citel. HTA is the engineering design firm that developed the designs which later became Citel's products.

Wilshe approached HTA with the idea of manufacturing and marketing plug-compatible equipment based on HTA's designs. Part of Citel's incorporation agreement allows the company to use the HTA engineering designs.

While the reorganization, relocation and loss of manufacturing capability may seem to spell trouble for Citel, Taylor claimed the venture is still moving along. "We have a letter of intent for a multiple-unit sale of our Model 5 to an end user," he revealed.

Citel is currently looking for alternative production arrangements. The company does not plan to ship any equipment until the third quarter, so the manufacturing setback is not too serious, Taylor maintained.

Taylor discounted the speculation that Citel is experiencing financial difficulties, but conceded that financing arrangements, while under way, are not yet complete. Citel principals are negotiating with private investors, including venture capital firms, Taylor said.

As for the E series announcement, Taylor said HTA will be able to provide designs for Citel's updated models 3 and 4 "as soon as IBM's announcement settles."

Like Citel, most new entrants in the IBM 370 plug-compatible arena will make few sales of low-end 370 replacements until the dust of the E series announcement settles, he forecast.

Executive Corner

Other Moves

• John C. Dean has joined the staff of the American Chemical Society's Chemical Abstracts Service as director of marketing.

• A. Lowell Lawson Jr. has been named vice-president and general manager of E-Systems' Greenville, Texas, Division.

• Joseph M. Murphy has been named president of Teleprocessing Business Systems, Inc., succeeding John P. Burke, who will continue to serve on the board of directors.

• John M. Dole has been appointed vice-president and general manager of Motorola, Inc. Data Products Division. In addition, Tom Koch was promoted to director of manufacturing operations and Henry Przestwor to director of business management.

• John S. Donnelly has joined Magnetic Controls Co. as vice-president. He is responsible for sales, marketing and engineering functions.

• Robert D. MacCormack has been named vice-president of international marketing at Applican, Inc.

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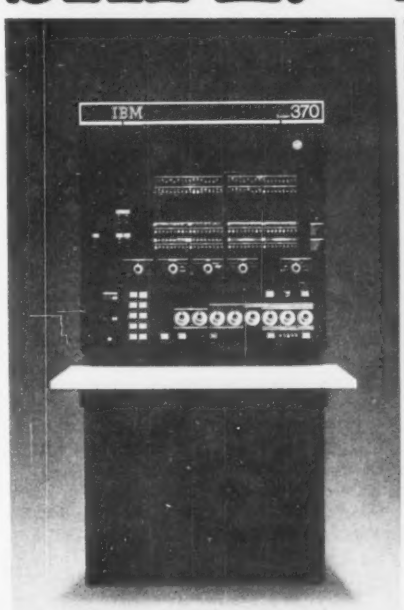
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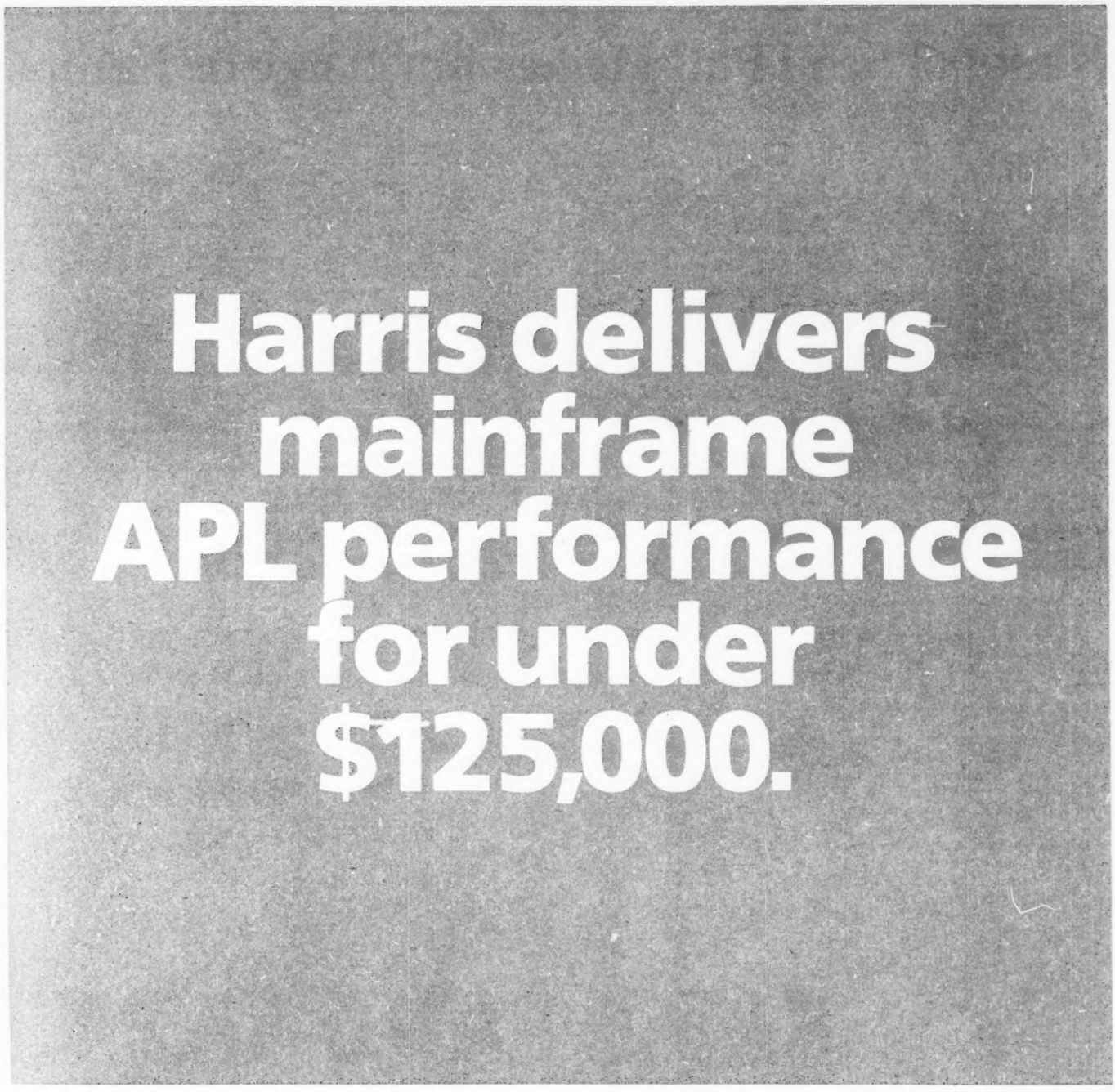
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Federal Intervention Urged to Spur Innovation

(Continued from Page 57)

"has recognized that in light of our present problems" of inflation and unemployment, "industrial innovation plays a critical role."

Such innovation, he said, "creates new industry, expands existing industries and directly attacks problems of unemployment and creation of jobs."

Ambitious Proposals

Responding to the call for recommendations, the advisory committees prepared a series of draft reports for discussion at the symposia. The reports called for a large number of government initiatives to encourage industrial innovation.

The most numerous and ambitious proposals were contained in two reports from the Advisory Subcommittee on Procurement and Direct Support of Research and Development. The committee, co-chaired by Thomas O. Paine, chief executive officer of Northrop Corp., and Jack Goldman, a vice-president and chief scientist of Xerox Corp., recommended, among other things, that the federal government:

- Develop a program to increase the support of R&D programs of national interest by "small, innovative companies and the testing of their innovative concepts."
- Direct the Department of Commerce to review whether "the incentive for innovation would be significantly increased by extending the life of patents from 17 to 25 years."
- Create an oversight committee under the leadership of The President's science advisor to "evaluate the appropriateness of the technical programs at major government laboratories and nonprofit centers and to judge their progress in promoting innovation."
- Convene a "blue ribbon commission" to review university R&D and recommend "new levels and kinds of support."
- "Explore the establishment of a new, decentralized industry-university R&D support program oriented toward promoting innovation in universities thorugh tax-deductible industry grants."
- "Accept and fund unsolicited proposals that the government has shied away from in recent years but that are often a source of innovative ideas for products and processes."

The procurement and R&D advisory subcommittee stated that "excessive taxes on capital gains and burdensome regulatory barriers have reduced investment incentives; organized opposition to technological changes has further discouraged innovation.

"The long-term consequences," the panel said, "include lower productivity, higher costs, inflation, unemployment, balance of payment problems and a lower standard of living.

"Because it does have such great power over industry," the group's report continued, "the government can stimulate renewed investment in innovation through improved procurement practices, stronger support of industrial R&D and tax reform that removes penalties from entrepreneurial capital investment."

Industry representatives, however, were not the only members of the policy review to ask for government programs in industrial innovation. The Labor Advisory Subcommittee called for an end to "preferential tax treatment of multinational corporations' foreign operations," regulation of the "export of American capital and technology" and "regulation of imports into the U.S. economy to help secure American jobs."

While recognizing that "industrial innovation is essential to a healthy economic growth, rising productivity and higher living standards," the committee's report maintained that "without a healthy, expanding,. full employment economy, without the expanding mass market made possible by rising real income and rising consumer buying power in the pockets of workers and their families, there is little incentive for business to engage in capacity expansion and in industrial innovation."

The Public Interest Advisory Subcommittee likewise suggested numerous government programs and policies for "stimulating and harnessing innovation" while at the same time urging the government to "make greater use of its existing authority to set specifications aimed at improving the quality, efficiency and safety of products the government purchases."

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The rapid pace of computer output technology is producing an increasingly varied array of equipment that is making current methods obsolete. There are now nearly 100 computer printer vendors, with more than 300 printer or printer families, using about a dozen techniques, ranging from 10 character/second cylinders and balls to sophisticated 14,000 line/minute laser xerography. In addition, manufacturers continue to pump out a wide range of COM units, microfilm equipment and CRT's. And many of these complex systems are becoming feasible and affordable for both large and small companies.

Computer Output Equipment is the topic of our February 26 *Computerworld* Special Report. Edited by Howard Karten, the report will be examining the increasing variety of computer output equipment, with problem-solving tips by users, as well as advice from vendors on topics like:

- *Output selection: hacking through the equipment jungle*
- *Microfiche and microfilm: designing and planning a COM system*
- *Color CRT's and their newfound applications*
- *High-speed non-impact printers: when do they get cost-effective?*

If you want to keep abreast of this ever-changing market, don't miss our February 26th Special Report.

And if you're marketing computer output equipment or services, here is where your ad should be. Call your *Computerworld* representative for further details. He can give you special assistance in ad planning. Or, to reserve space, call Terry Williams at (617) 965-5800. Closing date is February 9th.

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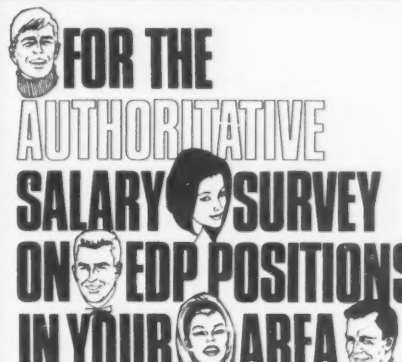
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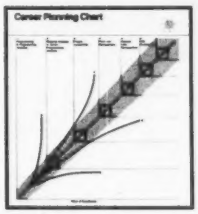
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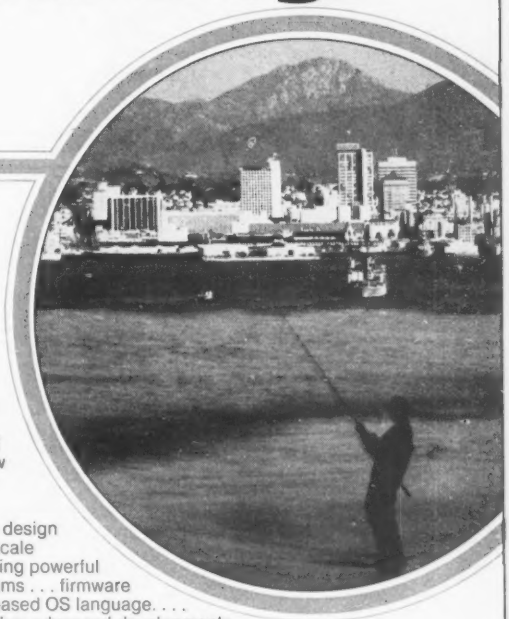
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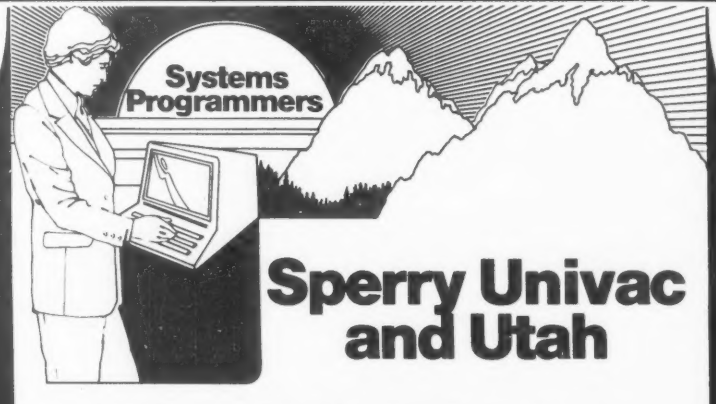
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PROGRAMMER/ANALYSTS



It's all a part of the stimulating atmosphere at the System Sciences Division of Computer Sciences Corporation. As a major division of one of the world's foremost leaders in scientific technology, research and development, the System Sciences Division has pioneered the advancement of information sciences in supporting major programs at the NASA Goddard Space Flight Center. You'll find the pace accelerated, the challenges abundant, and the look to tomorrow a defining aspect of our organization. Join us in the Maryland suburbs of Washington, D.C.

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CSC offers competitive salaries and a comprehensive benefits package, including a liberal relocation policy. For immediate attention, please call or send resume to:

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The Pace... The Challenges ....The Look To Tomorrow

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Certainly salary and advancement are important, but when you come to Romac, we "dig deeper" and search out those qualities that make you want to start each day with enthusiasm and vigor. Some call it our "getting up in the morning" syndrome. We call it a Romac difference. That's why many of the best EDP professionals look to us. Call us now for outstanding career opportunities like these representative positions.

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Contact your local Romac office in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford, Wellesley Hills or write A. L. Lemay, President, 2 Sun Life Executive Park, Wellesley Hills, MA 02181.

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If you have experience translating data processing jargon into plain talk and would like to join a fast-growing national documentation consulting practice located at the foot of Pikes Peak, contact

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Requires Master's degree and three years relevant experience, including a broad background in computer programming and management information systems. Knowledge of university financial systems is preferred, send complete resumes in application for Systems Coordinator #97090 by February 26, 1979 to:

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Requirements include a degree in Engineering or Physical Science or equivalent and 3-6 years experience in systems analysis and program implementation using a major data base management system. (CODASYL preferred). Experience with CDC 6000/CYBER under NOS is desirable.

The successful candidates will participate in developing and implementing an integrated systems design plan for geoscience data systems and related financial and administrative systems.

We offer competitive salaries, relocation assistance and excellent benefits.

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Michelin's list of superior benefits demonstrates that the fastest growing tire company in America values its employees. Benefits include comprehensive life insurance, AD&D, disability income, medical and dental insurance, plus a prescription drug plan (you pay only $1 for each covered prescription drug and Michelin pays the balance) and an outstanding Company-paid retirement plan.

Combine these benefits wih the advantages of Southern living in the southeast corner of the United States.

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Two to three years' experience in a manufacturing environment and exposure to COBOL, CICS, VSAM, DL1, OS, data base systems.

FORTRAN PROGRAMMERS
Minimum six months' experience as a FORTRAN programmer or 370/OS computer experience with numerically controlled machine tools, mechanical design, programming of graphic design systems helpful. Degree in Mechanical Engineering, Physics or Math, or related degree desired.

Send your resume today, and grow with Michelin.

MICHELIN
Michelin Tire Corporation
Manufacturing Division
Dept. SPA-7
P.O. Box 2846
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SYSTEMS ANALYST

(Senior)

We need a self-starter with skills/experience in developing computer-based systems and helping users benefit from new systems and procedures.

The position requires familiarity with accounting, mini-computers and interactive systems plus several years in systems and/or programming with a minimum of 2 years system design/installation experience.

Please send resume with salary history/requirements to: Van Waters & Rogers, P.O. Box 5932, San Mateo, CA 94403. Attention: Jim Raftery

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PROGRAMMER/ANALYST

Immediate opportunity for entry level progammer/analyst to help implement new systems. A knowledge of BASIC and an interest in business systems is required. We are a small department with many "ground floor" opportunities. This is an excellent processing from the beginning.

We are implementing interesting new systems in our previously manual offices and need your help.

Our company, a major distributor, is headquartered in San Mateo. We offer competitive starting salaries, a complete program of benefits and a pleasant, challenging place to work.

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INFORMATION SYSTEMS OPPORTUNITIES

The Government Products Division of Pratt & Whitney Aircraft has a number of attractive openings in West Palm Beach for MIS-oriented individuals. Desirable background for these positions should include an appropriate degree and 2-10 years experience in one or more of the following areas:

SYSTEMS DEVELOPMENT ANALYSTS

Manufacturing Systems

- Experience in user requirements definition, system design, development and implementation in a job shop manufacturing environment.

Product Support Systems

- Cobol experience.
- Emphasis on order entry commercial applications.

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- Must understand inter-relationship of all financial systems functions.
- Applications DB design experience desirable.

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- Experience in FORTRAN Scientific Application Programming
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Hardware Utilized At Government Products Division Include:

- IBM 3033
- Extensive interactive terminal network.
- Over 30 small-scale computer systems.

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- Familiar with business systems planning methodology.

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West Palm Beach, Florida 33402

UNITED TECHNOLOGIES

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PROGRAMMER ANALYST

Due to expansion, our Data Processing Department has a position available for an individual with a Bachelor's degree in Business, or equivalent combination of training and experience. The candidate would share in the responsibilities for design and programming of Automated Management Information System, with particular emphasis on Financial Management, also, for integration of newly developed sub-systems with existing computer applications. Required ability to become lead programmer, previous design experience, and 2 to 5 years CICS and COBOL are a must. A hospital background and experience with SHAS and hospital payroll a plus. Current configurations include, EBM 370-135 CICS VS and COBOL VS. Excellent salary and benefits. Submit resume to:

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Systems Programmer — To $27,000. Proficient in ALC, TSO and System/Job A bend Analysis. MVS/JES 2 & VSAM a plus.

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Systems Analyst — To $30,000. Spectra 70/45 or IBM 360/50. BAL.

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PROGRAMMER/ ANALYST

UNIV. OF TENNESSEE AT MARTIN

We seek an aggressive programmer/analyst to share in the responsibility for designing and programming our on-line university systems. This position, beginning March 15, requires a Bachelor's degree with courses in computer science or equivalent combination of training and experience. Proficiency in BASIC-PLUS with experience in a college or university is desirable.

UT-Martin, enrollment 5,000, is located in northwest Tennessee, utilizing a PDP 11 system with communication into an IBM 360/65 and an IBM 370/148.

Starting salary $12-14K. Advanced educational opportunities are available. Send resume by February 16 to:

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Typical assignments will involve:

SYSTEMS SOFTWARE
Design and integration of operating systems and software development

MAN/MACHINE INTERFACE
CRT graphics, loggers, operator's panels

APPLICATIONS
Electric power applications, both systems control and plant performance monitoring; Waste Water, CPI and other industrial applications

COMMUNICATION
Data acquisition, control output, computer-computer communications

SUPPORT PROGRAMS
Data base generators, display compilers, source editors, general utilities

Preferred backgrounds will include a B.S. degree in Engineering, Mathematics, Physics, or Computer Science and 2-5 years of hands-on related experience, with at least one year of FORTRAN in a scientific programming environment. Electric power experience in supervisory control, data acquisition, or automatic generation control is an asset, as is a knowledge of ASSEMBLY.

COMPUTER SYSTEMS TEST MANAGER
We have a career opportunity for someone to direct the activities of 18 System Test Engineers responsible for the integration, start-up and operational test phases of our process control systems. We need a graduate Electrical Engineer with 3 years of related technical management experience and exceptional organizing ability to deal with all aspects of digital test management, planning and scheduling.

PROJECT ENGINEER
This position will have technical and administrative responsibility. You should also have digital design and systems experience using TTL/ECL/CMOS logic. Knowledge of computer architecture, microprocessors, combinational and sequential logic a definite plus.

COMPONENT/ DESIGN ENGINEER
You will be responsible for component and vendor evaluation, and design and component problem solving. Interest in reliability analysis is an added plus. At least 1 year of experience using TTL, ECL or CMOS logic is required.

An equally important part of the profile of a Leeds & Northrup professional is the benefits program and competitive salary you enjoy—a salary that is reviewed along with your performance throughout the year, under our Short Cycle Evaluation Program (SCE), and the high visibility that goes with it.

Our location is another feature of Leeds & Northrup you'll be interested in. We are in a beautiful suburb of Philadelphia that offers excellent housing, public schools, and universities, and is within an easy drive of the cultural centers of Philadelphia and the mountains and seashore.

NOW THAT YOU KNOW SOMETHING ABOUT US, LET'S FIND OUT SOMETHING ABOUT YOU. CALL JIM HENDERSON, OUR MANAGER OF PROFESSIONAL EMPLOYMENT, ANYTIME, DAY OR NIGHT-WEEKDAY OR WEEKEND. HIS NUMBER IS: (215) 643-2000, EXTENSION 2010. OR, IF YOU PREFER, SEND YOUR RESUME TO: JIM HENDERSON, SYSTEMS GROUP, DEPT. CW-2/5. LEEDS & NORTHRUP, DICKERSON ROAD, NORTH WALES, PA 19454.

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Excellent Salary and fringe benefits package. Send inquiries including resume and salary expectation in confidence to:

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SYSOREX INTERNATIONAL INC., a rapidly growing Systems Management Company, now developing innovative multitechnology systems in Saudi Arabia, seeks experienced Data Processing Professionals for the following positions:

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You should have at least 5 years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM TP systems, preferably CICS and 3270 Terminals. Should be capable of leading large projects.

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You will be involved in applications design and programming in a TP environment on IBM 370 OS systems. Positions require minimum 4 years experience, fluency in COBOL and Assembler, and knowledge of IBM CICS and 3270 Terminals.

OPERATIONS INSTRUCTOR

You will be responsible for training Arabian personnel in computer operations. Must be completely familiar with IBM computer operations and possess instructor skills.

SYSOREX offers salaries commensurate with experience and a comprehensive benefits program which includes 30 day annual vacations with paid round trip transportation for employee & family to place of residence, 15 paid Holidays, free furnished family housing and free education of children.

Please send resume, including salary history, to Director of Personnel, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Ave., Cupertino, CA 95014.

SYSOREX
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Junior to Management Levels
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Silver Spring, Md. 20910
Call (301) 585-5010

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Manufacturer of Tungsten Carbide Products has an opening for a BAL Programmer. Minimum of 2 years experience with DOS/VS required. Experience on mini computer a plus. Position located in McKeesport, Pennsylvania plant. Liberal fringe benefit package. Salary commensurate with experience. Send resume stating salary requirements to: Personnel Manager, Teledyne Firth Sterling, 4 Parkway Center, Pittsburgh, PA 15220.

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GOOD NEWS FOR SYSTEMS PROGRAMMERS

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Reporting to the Manger of Technical Support, you will be responsible for troubleshooting and diagnosing problems of hardware and software malfunctions; designing and implementing custom software, establishing standards for operational and software use, and analyzing software in relation to our installation requirements.

You must have at least 2 years' Systems Programming experience, with in-depth knowledge of the structure and design of OS/VS operating systems. You should be familiar with advanced Assembly coding techniques, including EXCP and Macroes, with knowledge of SMP, SMF, VSAM, and Standalone Dump debugging.

Our hardware and software environment includes: IBM 370/145 & 158; CICS-BMS & DMS; REMOTE TELEPROCESSING; OS/VS-1; ROSCOE & LIBRARIAN; DATA BASE. Our planned expansion will lead to substantial reorganization of systems applications in the future.

We offer a competitive salary and outstanding benefits, including educational assistance and staggered work hours and days plus relocation assistance. Our continuing expansion means real advancement opportunities. **We also have excellent IBM and in-house DP education.**

Call Mel Patrick collect, our Manager of Technical Support, at (213) 480-3518, or send your resume in strict confidence, to the Personnel Department.

CARTE BLANCHE
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Los Angeles, California 90010

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Carte Blanche

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This opportunity exists at the Director or UP level with special emphasis in data communications products. You will be responsible for expanding an existing group into a major component of the corporate R&D structure.

Proven leadership in developing a variety of data communications and network products is essential. You must also have substantial knowledge of market and industry trends, including domestic and worldwide products.

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As our Data Communications Project Manager, you will face the challenge of defining marketing strategy, developing product definitions, guiding development efforts, and determining sales directions. You will enjoy high visibility and significant growth opportunities if you are the individual we seek.

To be that individual, you must have an in-depth knowledge of data communications with a strong base in marketing and the ability to undertake strategic planning. You must be a take-charge person whose sales background demonstrates continuous and accelerating success.

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Assume the responsibility for the analysis & development of Manufacturing Systems. Your background should include COBOL, structured programming & Data Base Management Systems. Position requires BS/BA in Computer Science or equiv. with 5-8 years Systems Analysis exp.

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Send resume, including salary history to Personnel Department, Waverly Press, Inc., 1310 Guilford Avenue, Baltimore, Maryland 21202.

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We have an unusual opportunity for an experienced hardware salesman. We are computer dealers based in Park Ridge, Illinois, specializing in the sale and leasing of used IBM computers and peripherals. We are adding 1 man to our small, select sales staff. The earnings potential is impressive. It's better than being in business for yourself. If you are interested, please call 312 297-7210.

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Responsible professionals capable of working in team environment in the development of compilers, text editors, loaders and computer-to-computer communication software. Requires degree in Computer Science and 1 - 2 years experience in systems programming or data communications.

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You will work directly from Project Leader's specifications writing or modifying prototype programs to implement tailored procedures for customer projects. Degree in Computer Science or comparable professional experience required.

Salaries commensurate with experience.

We're the leader in our field because we attract people who are the best in theirs. Send resume to:

Carol V. Veris,
Manager of Recruitment
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P/A CICS COBOL, ALP – $23-27K
SYSTEMS ANAL-CICS 3031 4 phase – $25-27K
PL 1 IMS Banking, deg – $23K
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The Intel Notebook

Careers and Technology at Intel

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We have an extraordinary career opportunity for medium and large-scale architects with 8 or more years design experience. You will become a key contributor in our newly formed computer architecture group for definition of future processors. Systems orientation and high level language knowledge is desirable. A BSEE/CS or equivalent experience is required.

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Here's your opportunity to work independently as part of a highly successful, growing state-of-the-art CAD engineering team. We have a career opportunity for you to design and implement follow-on CAD programs to support the development of our next generation microprocessors and LSI peripherals. A BSEE/CS or equivalent is required with experience as a software engineer for engineering applications using FORTRAN, ALGOL, SIMULA, or PL/1. You should also have digital logic and integrated circuit background. Experience with interactive graphics or data base is desirable.

For immediate consideration, please send your resume to Joyce Cordi, Intel Corporation, Dept. 6AC, P.O. Box 3078, Santa Clara, CA 95051. An equal opportunity employer m/f/h.

intel

Microcomputer Components

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If you have expertise in any area shown below, and want to enjoy the benefits of a large company and the challenge of a small organization, send your resume immediately for prompt confidential consideration. A bachelor's degree and U.S. citizenship are minimum requirements for all positions.

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- Software Systems Analyst/Programmer
- Programmer/Analyst
- Aerospace Engineer/Acoustics
- Systems-Analyst-Software
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LEAD ANALYST PROGRAMMER

Small Data Processing shop needs professional to supervise and participate in systems/programming activities, with ability to work independently, and to communicate effectively. Initial assignment will be as a member of a Business Systems Planning team, investigating the total informational needs of the company.

The ideal candidate will possess: Information Systems design experience; college degree; five years experience working in an IBM DOS environment; CICS & DL/I experience essential; and proficiency in BAL.

We offer progressive policy, opportunity for growth and excellent benefit package. Forward resume & salary history in confidence to:

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Newton, MA 02160

BUSINESS PLANNING STAFF

DATA BASE PRODUCTS AND SERVICES

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This position is Staff Assistant to Planning and Management team, responsible for business planning.

Duties:

Staff support, with special emphasis in areas related to preparation and communication of business plans. Monitoring, review, coordination and reporting of plan progress with senior management.

Qualifications:

Written and oral communication skills; Basic knowledge, training or experience in Marketing/Sales process; Works well with others in support role, Minimum of five years' work experience, preferably in computer products supplier side of industry;

Successful candidates will find a wide range of interesting work, a stimulating environment and excellent opportunities for career advancement, as well as competitive salaries and an excellent benefit package, e.g., company paid major medical, life insurance, dental plan, plus education and training courses.

If you are interested in a challenging and rewarding career in data base technology, please send your resume with salary requirements to:

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Austin, Texas 78766
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We are an international consulting firm. We presently are expanding our professional staff and have several career opportunities for the professional who enjoys a variety of assignments and is able to recognize and accept the challenge and growth potential that is available today in the consulting environment. We are currently interested in individuals with experience at various levels.

PROGRAMMER/ANALYSTS

Two plus years of application programming with excellent Cobol and OS JCL skills.

SR. PROGRAMMER/ANALYSTS

Five plus years of programming, experienced in the design development and implementation of application programs.

PROJECT LEADERS/CONSULTANTS

Experienced in the design development and implementation of major application systems in one or more of the following areas materials requirements, inventory control, purchasing, accounts payable, payroll/personnel or customer information systems.

IMS PROGRAMMERS

Two plus years in IMS programming in a large scale on-line environment.

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Proven successful experience in the implementation of major large scale on-line systems. Need excellent written and oral communication skill.

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This development workbench will be implemented on the MULTICS operating system, and will be initially used by the customer to develop software for the INTERDATA 8/32 computer.

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The several openings in this Operation to be filled now are especially well-timed and placed for long-term future growth. Your knowledge of communications software development and packet-switched networks will be especially appropriate.

Please forward your resume in confidence to the Director of Professional Staffing, Dept. 218, Box 486.

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By maintaining an environment that encourages creative freedom, coupled with our consistent procurement of long-term contracts and outstanding financial compensation — we've succeeded in building one of the finest teams of software professionals in the world.

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These positions require a degree in electrical engineering, computer science or related fields.

Involvement will be in any one of three specific areas requiring experience in Data General, NOVA/ECLIPSE or HP 2100 at the assembly language level. Digital or analog experience helpful.

NOVA—to involve the writing of process control and real-time control programs.

HQ 2100—working on operating systems, assemblers and loaders.

HP TODS BASIC—will involve working on automated acceptance and manufacturing test procedures for production hardware.



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We have a major systems development program in progress that is committed to developing advanced banking systems. Our systems involvement include time-sharing, personnel/payroll, trust and investment systems, commercial loans, mortgage loans, revolving credit, corporate services, branch automated systems in a highly professional environment. We are seeking . . .

PROGRAMMER ANALYSTS

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If your background includes solid COBOL programming experience on large scale IBM equipment with proven design-level skills, and you're ready to advance your career in a highly challenging environment then send your resume to:

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The choice of opportunities available in New England is as diverse and varied as our seasons. With over fifteen years of successful placement experience with high technology companies and business organizations throughout New England, E.P. Reardon Associates can help you find the position that you are seeking. The following is a partial listing of positions which are currently available.

Engineering

MANAGER — SOFTWARE DEVELOPMENT 35-45K
Here is an exciting opportunity for you to join a rapidly growing division of Fortune 100 electronics company and head up their development effort in the areas of language, software quality assurance, and documentation. You must have demonstrated managerial skills as well as in-depth experience with minis and data communications equipment. An advanced degree is also required.

PROJECT MANAGER 32-40K
You will be working within a research environment and be involved in state-of-the-art instrumentation work. Primary responsibilities will include consulting with program managers, selecting and maintaining hardware/software, and managing a staff of programmer/analysts. A minimum of 5-8 years of scientific programming experience as well as an advanced degree is required.

SR. SOFTWARE ENGINEERS to 30K
A growing mini-computer manufacturer currently has a wide selection of openings for degreed individuals with 3-5 years of experience in real time environments. These openings require individuals with specific experience in multi-task operating systems within a VM environment, memories, file control modules, systems architecture, device drivers, linkage editors, etc. Maintenance programming will not be involved.

COMMUNICATION SYSTEMS PROGRAMMERS to 30K
A leading mini-computer manufacturer currently has openings at various levels for individuals with experience in communications drivers, synch/asynch protocols, operating systems, HDLC or SDLC. Assembly language experience and a college degree are essential.

DIAGNOSTIC PROGRAMMER to 25K
A well-known commercial electronics company is in need of a talented individual to generate and debug assembly language software for micro-based systems. Three to five years of assembly language experience is required, while a familiarity with micro processor logic design would be helpful.

MICROPROCESSOR SOFTWARE ENGINEER 20-25K
An outstanding opportunity currently exists with a leader in the field of industrial process control equipment for an individual to implement I/O drivers, communications and console handling problems for new microprocessor-based man/machine interfaces. A BS, along with 2 years of experience in real-time assembly language programming is required. 8085 experience would be preferred.

ENGINEERING PROGRAMMERS 16-20K
Here is a chance for you to get involved in the analysis and programming of phototypesetting equipment. Using assembly language, you will perform coding, debugging, and the maintenance programming. Experience in solid graphics, interactive graphics, and mini or microprocessor programming is required.

ASSOCIATE PROGRAMMERS to 18K
Many openings exist at the near-entry level for individuals with a Bachelor's degree in math, computer science or electrical engineering. You must be familiar with Fortran and Assembly language programming. Experience on minis/micros is preferred, but mainframe experience is acceptable.

To investigate the above positions please phone collect or write Dan Meagher indicating position or positions of interest.

MIS

MANAGER MIS 30-32K
This position requires a take-charge individual to direct a staff of 35 professionals and support personnel, and assume responsibility for the development and implementation of computerized systems based on user requirements and the day-to-day production of all installed systems. A thorough knowledge of 370 systems is essential.

MANAGER 29-33K
A large computer manufacturer conveniently located west of Boston is in need of an individual to develop their marketing and financial systems and assume responsibility for planning and management in support of management control and order processing systems. Data base management exposure utilizing minis would be a definite plus.

SYSTEMS AND PROGRAMMING SUPERVISOR 25-29K
Here is an opportunity for a seasoned professional to get involved in project scheduling and planning, software selection and cost/benefit analysis, while supervising six programmer/analysts. You should have 5-7 years of experience in systems analysis and programming utilizing ANSI COBOL. A knowledge of H2000 OS with business and manufacturing applications in a data base environment is also required.

PROJECT LEADER 24-26K
The expansion of this division of a large Fortune 500 firm has brought about the need for an individual with heavy systems and programming skills to supervise a team of programmers. Experience in a large 370 OS environment utilizing ANSI COBOL is required.

SR. SYSTEMS ANALYST 19-26K
Opportunities for advancement go hand in hand with this position. You will be responsible for reviewing and analyzing present systems and applying standard techniques and procedures to make technical refinements, and improve maintainability for future expansion. Three to five years of financial applications experience within a manufacturing environment is required.

SR. PROGRAMMER ANALYSTS 19-27K
Several positions are now available both in Boston and in the suburban locations for individuals with 5-7 years of experience with ANSI COBOL, BAL, or PL/1 on an OS system. Opportunities are available in manufacturing, insurance, retail, hospital, and distribution environments. Many new installations offer training in CICS, data base, on-line, and time-sharing.

SR. PROGRAMMER ANALYSTS 18-26K
This suburban company offers high visibility and opportunities for advancement for an individual with 3-5 years of experience using ANSI with 370 DOS-VS and manufacturing or financial applications exposure. The ability to interface with users and assume overall project responsibility is also required.

PROGRAMMER ANALYST 16-24K
You will be responsible for designing, defining, coding, and testing of systems to support both manufacturing and finance, and assisting in the maintenance of existing systems. A knowledge of DOS-VS or OS-VS is essential, along with a minimum of 2-4 years ANSI COBOL experience within a manufacturing environment.

To investigate the above positions please phone collect or write Charles Bower indicating position or positions of interest.

If you prefer, we can also help you investigate positions in other parts of the country through our nationwide affiliations.

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Red Lobster Inns, the nation's largest, full-service, seafood restaurant chain, has the following immediate openings:

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To participate in the full range of point-of-sale system design, programming and implementation activities. Responsibilities will include designing and programming new systems, maintaining existing software, assisting users in determining operational requirements and information needs, coordinating and supervising equipment installation, analyzing system performance and monitoring vendor maintenance activities. Some travel will be required.

Background should include assembly languages and COBOL. Experience in system design, telecommunications or minicomputers will be helpful.

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To design and program a broad scope of sophisticated business applications. Experience should include a minimum of 4 years' experience in COBOL programming with exposure to systems design and project leadership in a 370 VM/CMS environment.

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If you qualify call Dick Greene TOLL FREE at 800-327-7465 or send your resume with salary history to Dept. RBG, Red Lobster Inns of America, Inc., P.O. Box 13330, Orlando, Florida 32859.

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SUPERVISOR DATA BASE DESIGN to $34,000. Florida. Major FL client seeks Data Base specialist to assume full responsibility for the dvlpmt & administration of DB for stored program control PBX environment. Supv 10+ people. Desirable low cost-of-living area. Refer RS.

MIS MGR., MFG. APPLICATIONS to $33,000. High-profile div level mgr position w/"Fortune 100" corp, attractively located. Supervise staff of DP pros responsible for total facility mfg & commercial systems. Req's 8+ yrs exp including Syst Mgmt. Refer HG.

PROJECT LEADER to $30,000. Leading div of nat'l company in Mid-Atl area seeks strong project leader resp for new on-line systems. Exp'd in TP & file design. Min 4-5 yrs exp in mfg or financial applications with COBOL. Refer RN.

SYSTEMS ANALYSTS to $26,000. Attractive VA location. Design & implement financial systems corp level. 370/COBOL environment. BS degree & 3+ yrs exp. Refer DM.

SYSTEMS PROGRAMMERS to $25,000. Ohio "Fortune 300" co offers state-of-the-arts operating systems on both mini-computer & large scale IBM, CDC, & UNIVAC hardware. Prefer bkdg with ASSEMBLY/FORTRAN language programming. BS preferred. Refer AT.

PROGRAMMER ANALYSTS to $25,000. Numerous growth opptys for programmers thru systems analysts who have Honeywell exp. 6-6600 series VA & MD locations. Exceptional potential & benefits. Refer DM.

SOFTWARE SYSTEMS to $25,000. Ohio "Fortune 200" co offers design opptys of software packages & associated hardware on IBM 370 & CDC-175. MVS/JES 3, CICS/VS, IMS or telecommunications & strong analytical approach to software dvlpmt. BS preferred. Refer AT.

PROGRAMMER ANALYST to $20,000. Charlotte, NC, major expansion. Most respected & technically sophisticated shop in city seeks several Programmer/Analysts w/min 1 year COBOL, IBM, OS or DOS exp for variety of business applications & systems. Full benefits, outstanding growth. Refer JS.

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PHILADELPHIA, PA 19102 — S. Burns, 1500 Chestnut St., 215/561-6300
ATLANTA, GA 30346 — R. Spano, 47 Perimeter Ctr., 404/393-0933
BALTIMORE, MD 21204 — R. Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28202 — J. Schwab, 1/42 Southern Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Rd., 216/749-6030
FORT LEE, NJ 07024 — R. Mansfield, 2125 Center Ave., 201/ 947-6920
McLEAN, VA 22101 — D. Miller, 7921 Jones Branch Dr., 703/790-1335
NEW YORK, NY —
NEW YORK, NY 10036 — W. McNichols, 1211 Ave. of the Americas, 212/840-6930
PITTSBURGH, PA 15222 — J. Beck, 4 Gateway Ctr., 412/232-0410
PRINCETON, NJ 08540 — R. Davis, 3490 U.S. Rte. 1, 609/452-8135
WILMINGTON, DE 19810 — H. Greene, 3411 Silverside Rd., 302/478-5150
HOUSTON, TX 77056 — G. Jones, 2801 S. Post Oak, 713/877-1600

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twin city federal data processing center

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SENIOR PROGRAMER ANALYST—Team oriented environment for programmers with 2–5 years experience in applications programming with knowledge of BAL. Knowledge of CICS, TSO, and COBOL a plus!

IBM "mini" PROGRAMMER ANALYST—A newly created department has need for an experienced programmer of 2–5 years with a good working knowledge of ALC. System 7 background highly desireable!

COMMUNICATIONS SYSTEMS ANALYST—Prefer 2 or more years communications systems experience on large IBM installation. MVS experience and knowledge of BTAM and multi-tasking highly desireable!

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Lori Hiatt
Personnel Department
TWIN CITY FEDERAL SAVINGS & LOAN ASSOCIATION
801 Marquette Avenue
Minneapolis, MN 55402

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Excellent benefits including medical and dental insurance, savings program and employer paid retirement benefits.

Please forward detailed resume and salary history to:

Syntex Ophthalmics, Inc.
Attn: Systems Manager
5060 N. 19 Avenue
Phoenix, Arizona 85015
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Within the next few weeks, we will be in your *local area* to meet with you. Please call Phil Beckhelm at 800/538-8460 x6165 (toll free) to arrange a confidential interview appointment.

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LOCAL INTERVIEWS FOR SUNNYVALE, CALIFORNIA POSITIONS

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City	Date
Washington, D.C.	February 16-17
Rhinebeck, N.Y. (Hudson Valley)	February 18-19
Raleigh, N.C.	February 18-19
Boston	February 18-19
Chicago	February 16-17

MVS DEVELOPMENT PROGRAMMERS

Our Software Development Group affords opportunities for individuals with:

- A broad base of competence in MVS concepts and operation
- In-depth experience with one or more of these areas: Supervisors, Storage Management, IOS, VTAM, TSO, Data Management (VSAM), and JES 2/3

This environment provides an ideal opportunity for experienced programmers to improve MVS performance on current and future systems.

VM DEVELOPMENT PROGRAMMERS

Our Software Development Group offers additional opportunities for experienced professionals with:

- A broad base of competence in VM/370 concepts and operation
- In-depth knowledge of one or more areas: VM/370 Control Program (CP), Conversational Monitor System (CMS), Net-Working, VM/SE; and VM/370 installation and functional characteristics
- Knowledge of Assembler and System/370 architecture
- Familiarity with Control Programs operating with VM/370

VM/370 projects will require highly knowledgeable designers who will identify areas that are candidates for performance and reliability enhancements. This is an exceptional opportunity for creative systems programmers to influence the future direction of VM/370 and to make it a product that will truly live up to its full potential.

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C.A.C.I.

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The successful candidates must be familiar with all aspects of software development, and meet the following minimum qualifications:

COMBAT MODELLERS TO 30K

- **Minimum of 4 years experience**
- **Ability to program in FORTRAN and/or SIMSCRIPT**
- **Demonstrated ability to lead projects**
- **Willing to relocate to Las Vegas**

PROGRAMMER/ANALYSTS TO 25K

- **2-3 years of FORTRAN and/or SIMSCRIPT applications**
- **Familiar with structured programming techniques**
- **BS or equivalent**
- **Willing to relocate**

PROGRAMMERS TO 20K

- **1-2 years experience**
- **Ability to program in FORTRAN, SIMSCRIPT or BASIC**
- **BS or equivalent**
- **Willing to relocate**

Desirable attributes include a current security clearance and background in graphics.

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Marcia Metcalfe, Manager
Software Development Department

CACI, Inc.-Federal
301 East Colorado Boulevard, Suite 400
Pasadena, California 91101

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Application, including transcript(s) and the names of three persons able to comment substantively on qualifications and experience as an academic programmer, should be sent to Dr. Gordon L. Galloway, Associate Director for Academic Computing, Denison University, Granville, Ohio 43023. DEADLINE: 19 February 1979.

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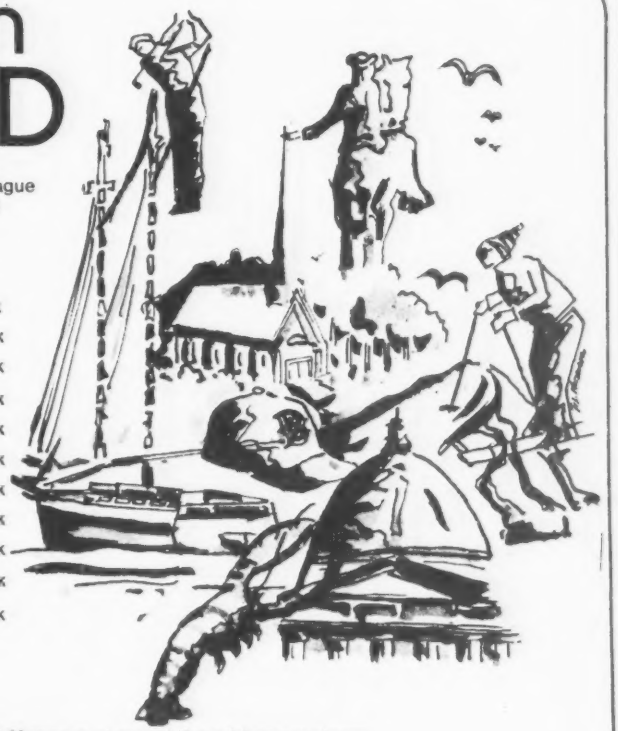
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Mktg. support prep. ad material.

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Fast-growing data center.

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EDP AUDITOR 24K
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SYSTEMS ANALYST 25K
Fortune "100" Co. IBM 370 OS/MVS.

PROG. ANALYST 23K
FORTRAN. PDP-11. Service bureau.

SYSTEMS PROG. 20K
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PROG. ANALYST 20K
Honeywell Model 200 COBOL

PROG. ANALYST 18K
PDP-11-70 MUMPS/FORTRAN

PROGRAMMER 18K
Banking shop - 370/168. COBOL/BAL.

PROGRAMMER 16K
COBOL Hewlett Packard 3000.

PROGRAMMER 15K
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SR. SYS. ANALYST 20K
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MINI CONSULTANT 25K
PDP-11, RMS-11, Software.

O/R ANALYST 22K
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MGR. TECH. SER. 33K
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MIS MGR. 40K
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We are looking for a self-starter who is willing to learn and assume responsibility for all areas of project development and maintenance. We can offer you a competitive salary, excellent benefits program and an opportunity for professional growth limited only by your own abilities. This is a perfect opportunity to broaden your overall application expertise and grow with our MIS team. Please send resume including salary history in confidence to:

Employment Manager
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$23,000 - $29,000 - Master's degree with emphasis in mathematics and management systems with successful experience in the supervision and programming of data processing hardware and software in a computerized system; demonstrated experience in dealing with operational and logistical problems related to a highly complex, sophisticated and powerful data system complex that has widespread interaction with every aspect of the College's operation both interpersonal and interorganizational. Application cut-off date is **February 15, 1979.** For official application write: **BROWARD COMMUNITY COLLEGE, Personnel Department, 225 East Las Olas Boulevard, Fort Lauderdale, Florida 33301.** An Equal Opportunity Employer.

CONTRACTS ADMINISTRATOR

Our software products group has an immediate need for a dynamic individual with experience in negotiating and administrating contracts for computer software products and/or software services for a vendor or user. Excellent written and verbal communication skills are required in coordinating with customer data processing, administrative and legal personnel, as well as our own marketing force.

Qualified applicants please send your resume including salary history and cover letter to Personnel Manager:

informatics inc
21050 Vanowen St.
Canoga Park, CA 91304

Equal Opportunity Employer M/F

Pacific Northwest

Data Processing Manager

A progressive Northwest facility seeks an individual who is currently managing the development of medium to large scale banking systems. This position reports to top management and is highly visible with responsibility for a staff of 60 professionals using large scale IBM equipment with TP. A degree in record of significant accomplishment in bank systems development is required. To 40K.

Systems Manager

Our client a leading manufacturer has an opening for a professional with strong business orientation. The successful candidate will act as internal consultant involving the planning and implementation of large scale business and manufacturing systems. Preferred experience is 5 to 7 years broad systems experience and have an MBA. To 35K.

Call in confidence or send resume including salary history to Al Friedman or Jim Klassen, Executive Resources, Inc., (206) 455-8300, 310 108th Avenue NE, Bellevue, Wa 98004.

Executive Resources, Inc.

PROGRAMMER/ANALYST

Insurance Company located in Midwest offering take-charge position due to expansion of MIS department.

- Programmers with H-6000 or HIS Level/66.
- Applications programmers with COBOL, GMAP.
- Additional pluses GCOS, IDS or CRT experience.
- Competitive salary commensurate with experience.
- Good benefits and career opportunities.

Please send resume to:

Norma Hicks
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2955 North Meridian St.
Indianapolis, Indiana 46207

Equal Opportunity Employer

LEAD PROGRAMMER/ANALYST

Consulting engineering firm requires experienced Programmer/Analyst. Duties will include team leadership and individual effort in development and maintenance of both engineering and accounting applications, FORTRAN AND COBOL. Plusses are multiprocessing environment, DBMS, HP3000 experience and JES.

Lower level position also to be filled.

Please telephone or send resume to:

FAY, SPOFFORD & THORNDIKE, INC.
Personnel Department
One Beacon St.
Boston, MA 02108
(617) 523-8300

Applicants will be considered on the same basis without regard to race, color, religion, sex, age, or national origin.

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PROGRAMMERS

South Florida Opportunities

Racal-Milgo, Inc., headquartered in South Florida is a world leader in the data communications field. In order to keep pace with our record sales and continued growth we have opened career opportunities at all levels for Programmers interested or involved in software development. These positions include the following:

SOFTWARE DEVELOPMENT

SYSTEMS PROGRAMMERS

These positions involve systems design and development of communications networks, familiarity with PDP-11, RSX 11M, RT 11 and microprocessor based systems. Intel 8080, 8085 experience is desired.

REAL-TIME APPLICATIONS PROGRAMMERS

Responsibilities include functional design and implementation of application related to the control of communications devices. This software will perform switching and controlling of communications network systems.

ENGINEERING PROGRAMMERS

Your involvement will include microprocessor operating systems design, communication software development, real-time software design, compiler design, terminal development, multiplexer software design.

APPLICATIONS PROGRAMMER

Should have a minimum of 2 years real-time assembly language experience in minicomputers or microprocessors, communications, teleprocessing, remote batch, IBM 3270/2260, Uniscope 100/200/400, VIP 7700 exposure helpful.

MANAGEMENT INFORMATION SYSTEMS

SYSTEMS SPECIALIST

Indi idual we are seeking should have 3 to 5 years systems analysis and programming experience with business applications utilizing ANS/COBOL. Experience in Univac 1100 series and degree preferred.

DATA BASE ANALYST DESIGNERS

Duties include analysis design and development of data bases for both batch and on-line applications utilizing DMS 1100 data base management systems. You will also be responsible for training, consultation, performance measurements and optimization of data base designs.

To arrange for a confidential interview, call Rod Manning collect at (305) 592-5996 or (305) 592-5997, Monday through Friday, 9 a.m. to 4 p.m. If unable to call, please submit your resume in confidence to:

Racal-Milgo

8600 N.W. 41st St., Miami, FL 33166 (305) 592-8600

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For full details of these & other fee paid positions, please call for immediate interview appointment or forward resume to Jim Hess.

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(215) 568-4580



SYSTEMS PROGRAMMERS

National CSS is an established leader in the computer services industry. Our time sharing hardware is powered by our superior operating system, VP/CSS. These host computers are interconnected by our own extensive communications facilities, including a 35-node nationwide packet switching network. We recently announced a mini computer with software more potent and flexible than any hardware at twice the cost.

We at National CSS are justly proud of our accomplishments, but we recognize the need for even more sophisticated software and hardware in the future. The following are some areas in which we have needs in our systems development department.

- **Operating system design**
- **APL internals**
- **OS/VS access methods**
- **VM/CMS or OS/VS internals**
- **Interactive systems**
- **Design and implementation**
- **Data communications**
- **270X or 370X T.C.U.'s**
- **HASP - RTAM internals**
- **ASYNCH and BISYNCH protocols.**
- **BTAM or VTAM**
- **Packet switching**
- **Circuit switching**
- **Routing**
- **Flow control**
- **Digitized voice**

If this environment interests you and you have the imagination, enthusiasm and know-how, we have a position for you.

Excellent starting salaries and comprehensive benefits package. For consideration please forward your resume with salary history to: (Only those resumes with salary history will be considered). Richard Brittain, National CSS, Inc., 542 Westport Ave., Norwalk, Connecticut 06851. or call TOLL FREE (800) 243-5068 outside Connecticut or (800) 882-6442 in Connecticut only.

National CSS
meet the challenge of our evolution

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GET OUT OF THE URBAN GRIND GET IN ON THE GROUND FLOOR!

The Opportunity:

Cornell University is significantly upgrading its data communications facilities. You will provide the technical leadership for implementing and tailoring state-of-the-art technology to fit Cornell's present and future needs. Knowledge of real-time programming techniques and link protocols is essential. Previous packet network experience, a strong electronics background, and 370 programming experience are definite pluses. Experience with VM/370 or 3705 software would be helpful. As a senior staff member you will contribute both ideas and technical talent to the design and implementation of the data network.

The Place:

Cornell University is located in the beautiful Finger Lakes region of upstated New York. The region offers great summer and winter sports possibilities. The Teleprocessing and Small Computer Support Group is a young organization dedicated to providing inexpensive, technically advanced data communications and micro-computer support to the Cornell computing community. The benefits package is attractive and Cornell is an Affirmative Action employer.

Please send your resume to Richard Alexander, OCS - Langmuir Lab, Cornell University Research Park, Ithaca, N.Y. 14853; or call (607) 256-7516. Call today.

Once in a Lifetime Opportunities you may have missed ...

- **The offer you turned down to trade your Edsel for a '57 Thunderbird;**
- **The blind date you refused who later became a sex film star;**
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- **The Early Days at Xerox ... or Texas Instruments ... or Digital Equipment**

At Falcon Systems, a jointly owned subsidiary of Durango Systems, Inc. and Mitsui, that kind of opportunity still exists for

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You must have experience working in an end-user sales organization installing small business application packages. Knowledge of BASIC is a definite plus.

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Build on your successful experience selling programmable computers, office products, or service bureau services to small business users to develop your full earning potential.

Associate yourself with our highly marketable product, the F-85, as we open our Chicago and New York offices. This micro-processor based, desk-top computer, weighing less than 65 lbs., including a high speed printer and disk, will become the standard for small business users. Make this the once in a lifetime opportunity you didn't miss.

We have already established an attractive benefits & salary package that allows you to share in the rewards of building a profitable Chicago or New York sales operation. Please send resume, or Call, Joe Crivello, Vice President, 600 Enterprise Drive, Suite 214, Oak Brook, Il. 60521. (312) 986-8575. An affirmative action employer.

FALCON SYSTEMS
A Subsidiary of Durango Systems, Inc. and Mitsui

WED Enterprises, The Design, Engineering and Development subsidiary of Walt Disney Productions located in Glendale California has immediate openings for Real Time Programmers.

In the areas of system applications we are seeking individuals to expand the department responsible for Real Time Data Acquisition and Control Systems for Disneyland and Walt Disney World.

Candidates must possess a technical degree with 2-3 years hands-on experience utilizing assembly language on minicomputer systems; Data General experience very desirable.

Experienced candidates interested in a career opportunity should submit resume and salary requirements to:



WED Enterprises - (JW107CW)
Professional Staffing - EPCOT
1401 Flower Street
Glendale, CA 91201

WED ENTERPRISES, INC.
AN EQUAL OPPORTUNITY EMPLOYER

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DATA PROCESSING

Louisville Bedding Company, a leader in the home furnishings business, manufacturing quilted, mattress pads, bedroom fashions, and decorative table linens, has career opportunities in their expanding corporate MIS group.

Project Manager

Experience in systems analysis and programming. Good oral and written communications. Knowledge in manufacturing areas desired. Minimum six years work experience; four of which must have been in Data Processing; two or more in systems analysis positions. Bachelor's degree desired but not required.

Programmer Analyst

Experience must include 3 or more years of analysis, design and programming. Knowledge of COBOL is required and experience with RPG II is helpful.

All traveling expenses for interviews and relocation expenses will be paid by the Company.

We offer challenging work assignments, competitive salary and an excellent benefit package. Send resume and salary history to: Mr. Donald R. Ward, Industrial Relations Manager

LOUISVILLE BEDDING CO.
Bluegrass Industrial Park
10400 Bunsen Way
Louisville, KY 40299
Equal Opportunity Employer

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The world's leading supplier of banking software with a location in sunny Central Florida has a challenging opportunity open for you.

We are embarking on a long range program to develop and upgrade major systems for the Banking/Financial Software Industry.

Software programs are written in COBOL and marketed for IBM and Burroughs Computer Systems.

PROGRAMMER/SYSTEMS ANALYSTS

Responsible for overall design, development implementation and maintenance of banking software applications.

Experience in development of loan and time deposits software systems desirable. Minimum of two years COBOL experience required. On-line and/or batch experience preferred.

Positions are available immediately and includes a comprehensive benefits package and salary commensurate with your experience and ability. For immediate response, please submit your resume to:

Personnel Director
FLORIDA SOFTWARE SERVICES
P. O. Box 2269
Orlando, Florida 32802

EDP Stock Brokerage Specialist

A prestigious New York financial institution is seeking a solid EDP professional to help expand and enhance an existing system. Experience in EDP stock brokerage accounting, operational systems, alternated audit procedure and COBOL programming are essential for this challenging position. Excellent interpersonal skills are imperative to this growth-oriented opportunity.

Salary in the mid $20's commensurate with ability and experience. Excellent benefits program. Send resume with salary history in confidence to:

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JT Jensen-Tracy Consultants Ltd. | Suite 1600, 711 Fifth Avenue New York, New York 10022

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Data General

COMPUTER SALES AND SYSTEMS ENGINEERS: WANT THE STRAIGHT FACTS? CALL US TODAY.

FACT: Data General is the growth story of the computer industry – from $1 million to over $375 million in 10 years.

FACT: 1978-Sales up 49%, earnings per share up 41%, over the previous year's record.

FACT: One of the highest percentages of revenue allocated to R&D in the industry, resulting in one new product on the average of every 12 working days in 1978.

FACT: 2000 people promoted in 1978.

And currently we have many opportunities throughout the country for Sales and Systems Engineers with backgrounds in Computer Engineering, Computer Science or Computer Programming, who have a desire to advance in the computer industry. You should have technical experience (in Sales or Software) in a minicomputer or mainframe environment.

SALES ENGINEERS

If you'd like a commission plan that places no limit on your earning potential, if you want to sell a full line from micro's to large computers, including peripherals...if you'd like to work in a company with other dedicated professionals from HP, IBM, DEC, Interdata, Univac and NCR, Data General has exciting opportunities for you.

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You will work with the latest state-of-the-art software (an advanced multi-process operating system, teleprocessing and powerful data management facilities as well as the most complete line of high level languages including PL/1, COBOL, FORTRAN V, BASIC and a block structured systems programming language); a broad range of hardware; and function as technical liaison with our customers.

For more information on immediate openings throughout the country, contact Regional Recruiters listed below (either call collect or send your resume, including salary history):

- New England: Jon Zion (617) 235-8171, 888 Worcester Road, Wellesley, MA 02181.
- Mid Atlantic: Jim O'Sullivan (212) 557-1122, 144 East 44th Street, New York, NY 10017.
- DC/MD/VA: Maury Shyne (703) 827-9600, 1757 Old Meadow Road, McLean, VA 22102.
- Midwest: Dale Malpass (312) 364-3000, 703 West Alonquin St., Arlington Heights, IL 60005.
- South: Richard Brown (404) 448-6072, 6855 Jimmy Carter Blvd., Suite 220, Norcross, GA 30071.
- West Coast: Dave Stockman (415) 321-8010, 2445 Faber Place, Palo Alto, CA 94303.

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Combine a Winter vacation to the Bay Area with a job search pre-arranged to match your requirements. Qualified applicants will find an exceptional market for data processing professionals.

Cobol/Prog. Anal.
Our client has multiple openings for COBOL/PL1 ASSEMBLER programmers, analysts, and project leaders in an advanced state-of-the-art IBM Data Base/IMS environment. Excellent career path – exceptional training opportunities.

Software/Systems Programmers
We have a number of growth opportunities for Assembly language programmers (preferrably with IBM, MVS, SVS, OS and DOS/VS backgrounds.

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Data Processing
Our client seeks Sr. EDP Auditors for an expanding department. Excellent salary/benefit/relocation package.

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OR NORTHERN CALIFORNIA
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(415) 434-1900

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Palo Alto, CA 94304
(415) 493-8700

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Salaries range $20-45,000 for technical contributors to senior management.
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Mini Computer Business Programmer	$23,000
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MVS Systems Programmer	$29,000
Financial Systems Project Leader	$26,500
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Senior Programmer - Analyst/IMS	$24,000
Data Base Analyst	$26,000
Honeywell 6000 COBOL Programmer/Analyst	$23,000

Interstate 128/495 Area

Technical Marketing Support Analyst	$28,000
COBOL Applications Programmer	$20,000
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CICS Technical Programmer/Analyst	$25,500
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IBM 370/OS COBOL Prog/Analyst	$23,500
370/DOS COBOL Programmer/Analyst	$22,000
DOS/VS Systems Programmer	$25,000
CICS Applications Programmer	$23,000
System/3 RPG II Prog/Manager	$21,500
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Remember at Source EDP you never need a resume, you never have to sign anything, you never have to fill out an application, and you never have to take time off from work to talk to us.

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Proj. Mgr. (Transportation)	To 30K
Senior Anal. (Inventory Systems)	To 26K
Prog. (CICS)	To 25K
Data Center Mgr (IBM 370)	To 30K
Compiler Designer	To 28K
Telephony Soft Eng	To 30K
TP Communications Analyst	To 26K
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Employer Retained Agency
Call or Send Resume to:

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(415) 362-0911

DATA PROCESSING

ESCO Corporation

We are a leading Portland based firm manufacturing and distributing steel products throughout the world. Our data processing environment includes Burroughs 4800 series equipment and COBOL language. We are seeking progressive individuals as:

Systems Analyst

Two openings exist, one in manufacturing scheduling and the other in manufacture costing. Prefer experience in manufacturing systems and require experience in COBOL.

Programmers

Two openings are available working with our manufacturing cost programs. Prefer experience with manufacturing cost systems and requires experience in COBOL.

Send resume to:

Dave White
ESCO Corporation
2141 NW 25th
Portland, OR 97210
or call (503) 228-2141
ext. 500

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DIRECTOR OF DATA PROCESSING

Massachusetts Division of Employment Security

The Division seeks a Director of its Data Processing Department. Current installation includes:

UNIVAC 1100/42
UTS 400 TERMINAL NETWORK
DMS-1100 DATA BASE SYSTEMS

Challenging opportunity to develop and implement three large scale online data base systems for use in the Division's 90 local offices. Director has primary responsibility for staff of 100 operations and systems personnel.

CANDIDATE SHOULD POSSESS:

Prior management experience in the development of online systems.
Computer/communications network operations experience.

SEND RESUME TO:
Mr. John P. Walsh
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Government Center
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San Francisco

Bring your IMS Internals skills to everyone's favorite city. Our systems programming department is seeking a senior IMS systems programmer interested in a change. Our needs require 6 years' DP experience, with 3 of the 6 years in systems programming.

Direct your responses to **Mr. Timm Archer, P.O. Box 7702, San Francisco, CA 94120** or call **(415) 544-2041.**

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DIRECTOR OF MANAGEMENT

INFORMATION SYSTEMS

Nassau Community College, the largest Community College in New York state, with a student enrollment of about 18,000, is seeking applicants for the position of the Director of Management Information Systems (MIS). The Director of MIS reports directly to the Vice President, Administration and Finance and is responsible for the coordination, general supervision, evaluation, control & development of the systems, programming and data operations of the College. The Director is responsible for insuring the security of the data base as well as the physical security of the on-site IBM 370/138, PDP 11/70 and associated peripherals and equipment.

The successful applicant should have a Master's Degree or a Baccalaureate with additional relevant training in Data Processing or related area. In addition, applicant should have a proven record of Managing an Educational MIS unit including both computer operations and systems analysis supplemented by a working knowledge of the financial and administrative needs of an institution of higher education.

Salary: Mid 20's/negotiable

Send complete resume (no telephone inquiries, please) by March 1, 1979 to:

Vice President Administration
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Programming Manager (Ins, 370)	$35,000
Programming Manager (Health Care, 370)	$35,000
MVS/JES 3 Internals	to $35,000
OS Systems Programmer	to $27,000
COBOL Programmers (All Industries)	to $26,000
Systems Manager (O&G, 370)	$40,000
Teleprocessing Specialists (370)	to $35,000
Programming Manager (Bank, 370)	$35,000
Data Base Specialists (IMS, IDMS, Etc)	to $32,000
Tech/Sci Programmers	to $28,000
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EDP Auditors & Managers	to $28,000
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Systems Analysts (All Industries)	to $27,000
MAS Consultants	to $26,000

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Instructor / Assistant Professor. Ph.D. in Computer Science or closely related field required for anticipated tenure track position. M.S. in C.S. considered for temporary position. All specialities will be considered. Salary negotiable and competitive. Starting Date: Sept. 4, 1979. Candidates should send a resume, copy of graduate transcript and 3 letters of reference to Dr. Andrew L. Perrie, Chairperson, Computer Science Dept, University of Wisconsin-Oshkosh, Oshkosh, WI 54901. **An Equal Opportunity Affirmative Action Employer.**

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$36,000 RANGE

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BOX 623 COMPUTER PARK HAMPTON, N.H. 03842

Software Support Programmers

Our Systems Division is seeking experienced Fortran programmers with minicomputer background to assist in the support activities associated with a major interactive graphics design software system. The successful candidates will possess a bachelor's or advanced degree in math or computer science, with a minimum of 2 years experience in Fortran programming and analysis in a minicomputer environment. Strong oral and written communications skills will be required and experience with interactive graphics and Hewlett-Packard minicomputer environments preferred.

We also have an opportunity available in Seattle.

We are a high technology company, a leader in the field of interactive graphics, automated design drafting systems and peripheral equipment. We offer salary commensurate with ability, full fringe benefits and growth potential.

Please send resume in confidence to
Watson Peterson, Jr., Director of Personnel

Gerber Scientific Instrument Company
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INTERNATIONAL COMPUTER NETWORK

SYSTEMS PROGRAMMERS
PROGRAMMER ANALYSTS

Opportunity to participate in the development and installation of a transatlantic computer network. Over the next 2 years Milton Bradley will be tying its British, Irish, French, German, Belgium, Dutch, and Italian operations into its East Longmeadow, Mass. computer center via satellite communications links. This requires an expansion of both U.S. and European staffs.
Hardware includes a 370/158 with AP on order for 1979 and 30XX for 1980. Software includes VM/370, CMS, 100+ terminal CICS/VS network and multi-DOS/VS.

Excellent salary and benefit program including very good tuition aid plan. Please send resume to:

MB MILTON BRADLEY
Manager Personnel Administration
MILTON BRADLEY CO
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DATA BASE ADMINISTRATION
SYSTEMS ANALYSTS
AND PROGRAMMERS
Honeywell 66/80

Enhancements to nationwide information terminal system utilizing TPE2 and IDS have created a need for additional data base and application specialists at the headquarters of the largest trade union in the Western Hemisphere.

DATA BASE ADMINISTRATOR - Requires previous experience as a DBA or senior data base analyst/programmer using IDS. Some travel required. Responsible for design, implementation, and support of integrated on-line organization-wide data base utilizing TPE2.

APPLICATIONS ANALYSTS/PROGRAMMERS - A strong application programming background required. Some travel necessary. Transaction processing and/or IDS programming desirable but not mandatory. A challenging position for someone willing to learn.

Openings are at our Washington, D.C. facility. Full TPE2 training will be provided. Offer includes competitive salary, excellent health and pension benefits, relocation expenses, and a professional working environment in a new facility with excellent career opportunities. Qualified applicants are encouraged to send resume, in confidence to:

John Hardy
International Brotherhood of Teamsters
25 Louisiana Ave., N.W.
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PROGRAMMER/ ANALYSTS

Are you currently working in a data processing environment which does not let you use your ingenuity in programming or design?

Looking to make a move to a fast-paced, growth-oriented organization?

Look at us. We provide divisions in our billion dollar corporation with computerized systems to meet their Financial/Distribution, Marketing, Manufacturing and Administration needs.

To keep pace with AHSC rapid growth rate, we have to expand our staff. We want people who are ready and willing to grow with us.

To qualify you must possess:
- Minimum 2 years COBOL in a Business Systems environment
- Excellent oral and written communication skills
- BA or BS degree or equivalent experience

In exchange for your expertise we offer:
- Full benefits package including 100% tuition reimbursement
- Top salary
- Career planning
- Full time training staff
- Paid relocation expenses

Sound interesting? Send your resume to:
Eric E. King
(312) 473-1400 EXT. 122

American Hospital Supply Corporation
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Management Services Division
1400 Waukegan Road
McGaw Park, Illinois 60085
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PROGRAMMER ANALYST

Profitable div. of large mfg. co. located in the capital region of N.Y. State requires data base exp. to implement "state of the art" package. Project is expected to span approx. 3 yrs. Candidates must be able to work closely with mgr. of MIS, as well as develop user interface & definition. Excellent benefit pkg. and relocation policy. (Fee Paid) $23,000.

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Agency
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FINANCIAL SYS. ANALYST/ DATA PROCESSING MGR.

Wiener Laces Inc., an established and growing manufacturer of textiles, lace and embroideries, is seeking an experienced Financial Systems Analyst — D.P. Manager for our Jersey City headquarters.

The person we seek must have college education, preferably in business with an accounting background. This individual will have heavy experience in RPG II language and System 34 or System 3 in designing, programming and implementing financial systems to payroll, G/L., A/P, A/R, cost systems, budgets and inventory control.

To explore this excellent opportunity, please send your resume and salary requirements in confidence to: *CONTROLLER, WIENER LACES INC. 34 EXCHANGE PLACE, JERSEY CITY, N.J. 07302.*

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You will be responsible for managing the design, development, implementation, maintenance and operation of new and existing operational and management information systems. Related management activities include the supervision of a professional staff of 20, customer and interal training programs and development of internal management systems.

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Languages: COBOL, MARK IV, etc.
Library Maintenance: Librarian
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Interested, qualified applicants should submit detailed resumes including salary history and geographical preference to: **Box 1318, 140 Second Street, San Francisco, CA 94105,** or call **Don Molteni - Toll Free 800-227-4699 (outside California) between 1-5PM PST, Mon-Fri.** All resumes will be answered.

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Systems analyst/programmer II requires high school or GED and one year full-time experience as a systems analyst/programmer I or equivalent; or BS in job related area; or an equivalent combination of post-secondary education and experience in programming and/or analysis. Systems analyst/programmer III requires one year as a systems analyst/programmer II or equivalent; or six months of experience as a systems analyst/programmer II or equivalent and an MS degree in a job related area; or one year of experience in programming and/or analysis and a BS in a job related area.

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or

TONY LAMIA

VICE PRESIDENT

SRZ Software Services, Inc.
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(805) 497-6975

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You will conduct Systems Feasibility Studies, Systems Analysis and Design, Programming, Testing, and Debugging, Systems Program Documentation and Procedure Writing. Experience should include DBOMP Software; Data Base systems and CRT systems desirable.

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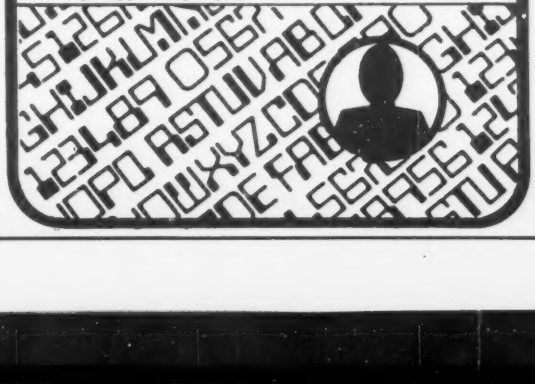
Project Leader

You will run on-line programming tests using CMS; supervise systems work and maintenance programming; and help us convert our present system to data-base, using our advanced DL-1. You should have 5 years experience that includes a thorough knowledge of COBOL, and hands-on experience with IBM equipment. Supervisory background a must, project leader experience preferred.

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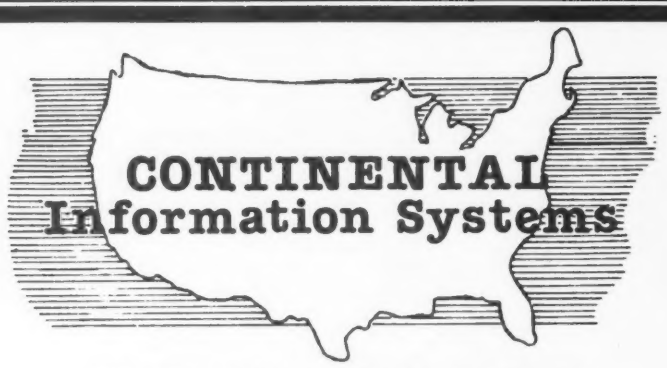
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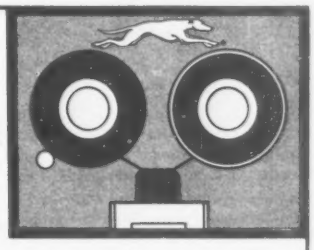
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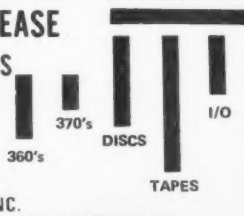
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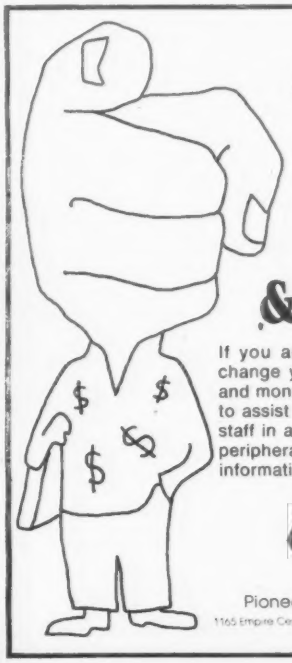
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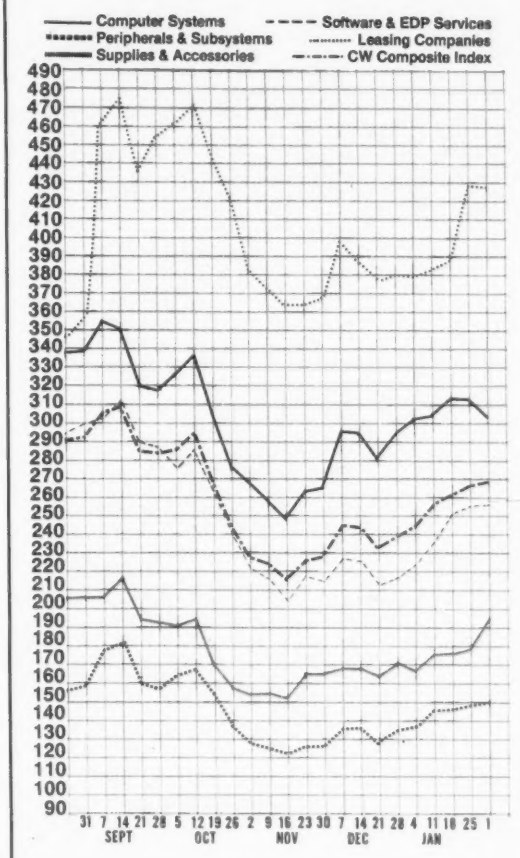
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Three Months Ended Dec. 30

	1978	1977
Shr Ernd	$.33	$.24
Revenue	11,392,000	9,312,000
Earnings	1,063,000	619,000
9 Mo Shr	.95	.55
Revenue	32,431,000	23,493,000
Earnings	2,709,000	1,448,000

FOUR-PHASE SYSTEMS
Year Ended Dec. 31

	1978	1977
Shr Ernd	$2.58	$2.19
Revenue	135,647,000	88,508,000
Tax Cred	....	1,790,000
Earnings	12,196,000	9,143,000
3 Mo Shr	.70	.52
Revenue	38,772,000	26,006,000
Earnings	3,485,000	2,224,000

PRIME COMPUTER
Year Ended Dec. 31

	1978	1977
Shr Ernd	$1.46	a$.73
Revenue	93,554,000	50,032,000
Tax Cred	....	150,000
Earnings	8,406,000	3,926,000
3 Mo Shr	.43	a.25
Revenue	26,541,000	15,831,000
Earnings	2,470,000	1,386,000

a-Adjusted for two-for-one stock split paid in June 1978.

TANDEM COMPUTERS
Three Months Ended Dec. 31

	1978	1977
Shr Ernd	$.24	$.21
Revenue	10,398,000	3,909,000
Tax Cred	....	301,000
Earnings	951,000	638,000

WANG LABORATORIES
Three Months Ended Dec. 31

	1978	1977
Shr Ernd	$.51	$.30
Revenue	75,119,000	47,148,000
Earnings	6,315,000	3,378,000
6 Mo Shr	.81	.48
Revenue	130,893,000	83,369,000
Earnings	9,852,000	5,247,000

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 31ii, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1978-79 RANGE (1)	CLOSE JAN 31 1979	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	28- 69	45 1/8	-2	-4.2
N	BURROUGHS CORP	59- 87	70 1/2	-1	-1.3
O	COMPUTER AUTOMATION	15- 44	23 3/4	0	0.0
N	CONTROL DATA CORP	23- 44	33 7/8	-2 7/8	-7.8
O	CRAY RESEARCH INC	8- 33	30 1/2	+ 1/2	+1.6
N	DATA GENERAL CORP	42- 71	60 1/4	-3 3/4	-5.8
N	DATAPOINT CORP	34- 75	69 1/2	-2 1/2	-3.4
N	DIGITAL EQUIPMENT	39- 58	53	-1 7/8	-3.4
N	ELECTRONIC ASSOC.	2- 13	7 3/8	- 1/4	-3.2
A	ELECTRONIC ENGINEER.	9- 19	12 1/8	- 1/8	-1.0
N	FOUR-PHASE SYSTEMS	19- 46	33 7/8	-1 1/8	-3.2
N	FOXBORO	28- 40	31 3/4	+ 1/4	+0.7
O	GENERAL AUTOMATION	7- 26	13 3/8	-2 1/8	-13.7
O	GRI COMPUTER CORP	1- 3	1 1/8	- 1/8	-10.0
N	HEWLETT-PACKARD CO	62- 95	87	-2	-2.2
N	HONEYWELL INC	43- 76	70 1/8	-2 5/8	-3.6
N	IBM	236-316	308 3/4	+ 1/4	0.0
O	MANAGEMENT ASSIST	9- 29	19 3/8	-1 3/8	-6.6
O	MANUFACTURING DATA S	9- 23	21 5/8	0	0.0
O	MICRODATA CORP	10- 23	18 3/8	-1 3/8	-6.9
O	MINI-COMPUTER SYST	4- 8	5 3/4	+ 3/4	+15.0
O	MODULAR COMPUTER SYS	7- 17	16	- 3/8	-2.2
N	NCR	37- 70	65 7/8	-2 3/4	-4.0
N	PRIME COMPUTER INC	20- 43	28 5/8	-3 1/4	-10.1
N	PERKIN-ELMER	17- 31	29 3/8	0	0.0
N	SPERRY RAND	33- 49	47	- 7/8	-1.8
A	SYSTEMS ENG. LABS	11- 24	14 3/4	- 1/2	-3.2
O	TANDEM COMPUTERS INC	13- 37	28	- 1/4	-0.8
A	WANG LABS.	12- 36	33 7/8	- 7/8	-2.5

LEASING COMPANIES

O	BOOTHE COURIER CORP	13- 21	19 1/2	0	0.0
O	COMDISCO INC	9- 22	21 1/2	+2 1/4	+11.6
A	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 7/8	- 1/8	-3.1
O	CONTINENTAL INFO SYS	5- 15	8 1/2	+1 1/2	+21.4
W	DATRONIC RENTAL	1- 3	2 1/8	0	0.0
A	DCL INC	3- 5	3 7/8	- 5/8	-13.8
N	DPF INC	8- 14	10 1/2	- 1/8	-1.1
N	ITEL	16- 36	24 3/4	-1 3/4	-6.6
N	LEASCO CORP	24- 39	37 5/8	+ 1/4	+0.6
O	LEASPAC CORP	1- 4	2 5/8	+ 1/8	+5.0
A	PIONEER TEX CORP	3- 7	3 3/8	- 1/4	-6.8
N	U.S. LEASING	13- 20	14	- 3/4	-5.0

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O	ADVANCED COMP TECH	1- 2	1	0	0.0
O	ANACOMP INC	8- 22	16 1/2	+1 7/8	+12.8
A	APPLIED DATA RES.	8- 17	12 1/8	0	0.0
N	AUTOMATIC DATA PROC	24- 36	31	+ 3/4	+2.4
O	COLEMAN AMERICAN COS	1- 2	1/2	0	0.0
O	COMPU-SERV NETWORK	5- 12	8 3/4	+1 1/2	+20.6
O	COMPUTER HORIZONS	1- 9	5	-1 1/4	-20.0
C	COMPUTER NETWORK	6- 16	6 1/4	- 3/8	-5.6
N	COMPUTER SCIENCES	8- 17	12 1/8	- 1/2	-3.9
C	COMPUTER TASK GROUP	1- 5	4 3/4	- 1/4	-5.0
O	COMPUTER USAGE	2- 4	3 1/4	+ 3/8	+13.0
O	COMPUT AUTO REP SVC	4- 10	7 1/4	+ 1/8	+1.7
C	COMSHARE	6- 19	17 1/2	+ 1/4	+1.4
O	CULLINANE CORP	14- 33	21 1/4	0	0.0
O	DATA DIMENSIONS INC	4- 9	5 1/4	+ 3/8	+7.6
O	DATATAB	1- 2	2 1/8	0	0.0
N	ELECTRONIC DATA SYS.	15- 25	19	-1	-5.0
O	INSYTE CORP	1- 3	1 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	- 1/8	-4.0
O	KEANE ASSOCIATES	3- 6	5	0	0.0
O	KEYDATA CORP	1- 3	2 3/4	+ 1/4	+10.0
A	LOGICON	10- 19	13	- 1/8	-0.9
A	NATIONAL CSS INC	15- 36	27 5/8	- 3/4	-2.6
O	NATIONAL DATA CORP	7- 13	9 3/8	0	0.0
A	ON LINE SYSTEMS INC	12- 30	17 1/4	- 1/8	-0.7
N	PLANNING RESEARCH	4- 10	6 3/8	- 1/4	-3.7
O	PROGRAMMING & SYS	1- 1	1 1/8	- 1/8	-10.0
O	RAPIDATA INC	3- 7	5	- 1/8	-2.4
O	REYNOLDS & REYNOLD	16- 36	28 3/4	+1 1/4	+4.5
O	SCIENTIFIC COMPUTERS	3- 9	8 1/8	+ 3/8	+4.8
O	TYMSHARE INC	18- 34	33	+2 7/8	+9.5
A	URS SYSTEMS	5- 8	6 1/2	0	0.0
N	WYLY CORP	1- 7	4 7/8	- 1/8	-2.5

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	14- 32	23 5/8	- 1/4	-1.0
O	ADVANCED MEMORY SYS	7- 18	14 3/8	+ 3/8	+2.6
N	AMPEX CORP	10- 19	15 3/4	- 1/4	-1.5
O	ANDERSON JACOBSON	5- 10	6 1/2	+ 1/4	+4.0
N	APPLIED DIG DATA SYS	9- 22	11 1/8	- 1/2	-4.3
O	BEEHIVE INT'L	3- 7	5 1/8	+ 1/2	+10.8
A	BOLT,BERANEK & NEW	6- 14	11 1/2	0	0.0
N	BUNKER-RAMO	10- 20	18	+ 5/8	+3.5
A	CALCOMP	3- 13	6 5/8	0	0.0
O	CAMBRIDGE MEMORIES	3- 9	4 1/2	- 5/8	-12.1
N	CENTRONICS DATA COMP	16- 37	34 1/8	+1 1/8	+3.4
O	COGNITRONICS	1- 4	1 5/8	+ 1/8	+8.3
O	COMPUTER COMMUN.	6- 7	7 1/2	+ 1/2	+7.1
C	COMPUTER CONSOLES	4- 10	8 1/2	0	0.0
A	COMPUTER EQUIPMENT	3- 6	4 7/8	0	0.0
O	COMPUTER TRANSCEIVER	1- 5	4 5/8	- 3/8	-7.5
C	COMPUTERVISION CORP	9- 30	27 1/4	-2 1/4	-7.6
O	CONTEN	9- 38	24 1/2	+3	+13.9
A	CONPAC CORP	13- 26	14 3/4	+ 1/2	+3.5
O	DATA ACCESS SYSTEMS	3- 14	11 1/2	+ 1/2	+4.5
O	DATA 100	9- 20	19 1/2	0	0.0
A	DATA PRODUCTS CORP	14- 25	17 5/8	- 5/8	-3.4
O	DATUM INC	2- 6	3	0	0.0
O	DECISION DATA COMPUT	2- 6	3 5/8	+ 1/8	+3.5
O	DELTA DATA SYSTEMS	1- 1	1/2	+ 1/8	+33.3
A	DOCUMATION INC	6- 34	23	+ 3/4	+3.3
O	DATARAM CORP	6- 32	17	+ 1/2	+3.0
N	ELECTRONIC M & M	6- 9	4 5/8	- 1/4	-5.1
O	FABRI-TEK	1- 2	7/8	-	-6.2
O	GENERAL COMPUTER SYS	1- 3	2 3/4	+ 3/8	+15.7
O	GENERAL DATACOMM IND	9- 21	15 3/4	+ 3/4	+5.0
N	HAZELTINE CORP	10- 17	13 1/4	- 1/8	-0.9
N	HARRIS CORP	17- 36	31 1/4	+ 5/8	+2.0
O	INFOREX INC	6- 11	8 3/8	- 3/8	-4.2
O	INFORMATION INTL INC	7- 12	9 3/4	- 1/4	-2.5
O	INFOTON	1- 3	2 5/8	- 3/8	-12.5
O	INTEL CORP	39- 82	54	-4	-6.8
A	LUNDY ELECTRONICS	4- 8	5	- 1/8	-2.4
O	MSI DATA CORP	10- 19	12 1/2	- 3/8	-2.9
N	MEMOREX	27- 59	32 3/8	- 1/4	-0.7
N	MOHAWK DATA SCI	6- 15	10 3/8	- 1/2	-4.5
O	OMEX	2- 6	5 1/2	0	0.0
O	PARADYNE CORP	9- 17	13 1/4	+ 3/4	+6.0
O	PENRIL CORP	5- 12	10 3/4	- 1/2	-4.4
N	PERTEC CORP	9- 17	10 5/8	0	0.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	QUANTOR CORP	2- 5	2 3/4	0	0.0
O	RECOGNITION EQUIP	7- 13	8 1/8	- 1/2	-5.7
O	SCAN DATA	1- 5	2 3/4	+ 1/8	+7.1
N	STORAGE TECHNOLOGY	19- 46	31 3/4	-2	-5.9
O	T BAR INC	11- 20	18 1/2	- 3/4	-3.8
O	TALLY CORP.	4- 14	10 1/4	0	0.0
A	TEC INC	6- 13	6 1/2	- 1/4	-3.7
N	TEKTRONIX INC	33- 54	50 3/4	-2 5/8	-4.9
N	TELEX	3- 9	6	- 1/2	-7.6
O	TESDATA SYSTEMS CP	9- 23	13 1/2	+1	+8.0
O	WILTEK INC	1- 2	5/8	0	0.0

SUPPLIES & ACCESSORIES

A	AMERICAN BUS PRODS	6- 11	8 1/4	- 3/8	-4.3
O	BALTIMORE BUS FORMS	1- 4	2	+1	+100.0
A	BARRY WRIGHT	14- 34	31	-1 1/4	-5.8
O	CYBERMATICS INC	1- 1	3/4	+ 1/8	+20.0
O	DUPLEX PRODUCTS INC	13- 30	17 3/4	+ 3/8	+2.1
N	ENNIS BUS. FORMS	8- 17	13 5/8	0	0.0
N	3M COMPANY	43- 66	62	-1 5/8	-2.5
O	MOORE CORP LTD	26- 34	28 3/4	- 1/2	-1.7
N	NASHUA CORP	18- 37	25 5/8	- 7/8	-3.3
O	STANDARD REGISTER	20- 27	25 1/2	+1 3/4	+7.3
A	TAB PRODUCTS CO	8- 16	12 1/4	-1 1/8	-8.4
N	UARCO	19- 52	51 1/2	+ 1/8	+0.2
A	WABASH MAGNETICS	10- 22	15 7/8	+ 7/8	+5.8
N	WALLACE BUS FORMS	18- 33	24 1/4	+ 1/4	+1.0

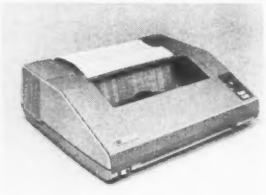
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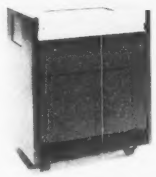
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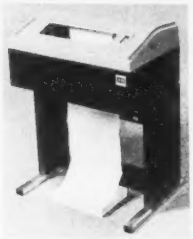


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